

CAPTURING PERCEPTIONS: INSTAGRAM AND THE HIGH LINE



CAPTURING PERCEPTIONS: INSTAGRAM AND THE HIGH LINE

by

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ABSTRACT

The public's fascination for using tools to view the landscape dates as far back as mid-1600. The Claude Glass, while void of definitive origin, gained popularity among tourists and amateur artists as a way to replicate the picturesque landscape first embraced by French painter, Claude Lorrain. The iPad, in conjunction with the Instagram App, offers today's viewer a similar experience with the modern convenience of saving and disseminating the views to the masses.

While the repetitive nature of history only further solidifies the success of Instagram, the difference with today's device lies in the ability to harness, inventory and analyze the data using an Application Programming Interface (API). Through a series of photos collected of the High Line in New York City over a seven-day period using the Instagram API Console, this study looks to answer the question, how can Instagram be used to gather user perceptions about the built environment? Working within the context of an adaptive process, the developer end of Instagram was proficiently mastered and a new tool was created as a means of conducting the research query. Both manual and automated processes were applied to expose commonalities and hidden patterns. While the ambitious undertaking revealed Instagram could be applied, the study opened up more questions concerning the viability of using a new tool capable of querying public images as a way to inform landscape architecture practitioners.

As our world becomes more and more data centric, the design profession has the ability to tap into this relatively untouched resource as a means to gather information and shape the future of the built environment. This research offers a subjective analysis of passive images not capable of revealing the story behind the lens. Future research questioning the motivation behind the camera is needed to ground the idea of capturing perceptions through Instagram and move the ideas formulated in this study past theory.

TABLE OF CONTENTS

LIST OF FIGURES	vii
ACKNOWLEDGMENTS	ix
DEDICATION	x
CHAPTER 1: INTRODUCTION	1
VIEWING THE LANDSCAPE: Transitions in Technology	3
CHAPTER 2: BACKGROUND	9
TECHNOLOGY AND THE LANDSCAPE: A Foundation Rooted in Viewing and the Evolution from Capturing to Sharing	10
POST OCCUPANCY EVALUATION: Assessing the Visual Quality of the Landscape	23
DIGITAL MEDIA, INSTAGRAM AND THE HIGH LINE: New Tools for Assessing the Built Space	25
CHAPTER 3: METHODOLOGY	39
RESEARCH QUESTION	41
DEVELOPMENT OF THE TOOL: dCODE	45
TESTING THE TOOL: dCODE and the High Line	49
CHAPTER 4: FINDINGS	67
SECTION ONE:	

The Query	69
SECTION TWO: Hypothetical Professional Report	74
SECTION THREE: Reflections on the Tool	76
CHAPTER FIVE: DISCUSSION	83
THE CREATION OF dCODE	86
BIBLIOGRAPHY	97
APPENDIX	101

LIST OF FIGURES

Figure 1.1 Photograph taken by the researcher in 2010	4
Figure 1.2 Photograph taken by the researcher in 2015	4
Figure 2.1 <i>Landscape with Tobias and the Angel</i> , 1642. Pen and brown ink with brown wash and white heightening on blue paper	14
Figure 2.2 <i>View of Trivoli at Sunset</i> , 1642-44, Oil on canvas. Fine Arts Museum of San Francisco	14
Figure 2.3 <i>Ideal View of Trivoli</i> , 1644, Oil on canvas. New Orleans Museum of Art	14
Figure 2.4 Examples of the Claude Glass	15
Figure 2.5 A distorted view of a lake at Derwentwater, The Lake District, England	16
Figure 2.6 Modified Kaplan Matrix	18
Figure 2.7 Eight categories from <i>What We Instagram: A First Analysis of Instagram Photo Content and User Type</i>	22
Figure 2.8 <i>World's Most Popular Landmarks</i> , images 1 - 9 from Spagnolo, image 10 from the Instagram API data query	29
Figure 2.9 <i>Top Ten Most Instagrammed Places in the World</i> , images 1 - 9 from Instagram, image 10 from the Instagram API data query	30
Figure 3.1 Main methodologies diagram	44
Figure 3.2 Steps involved in the dCODE tool	46
Figure 3.3 Weather conditions for the week of June 14 through June 20, 2014	48
Figure 3.4 Methodology steps	49
Figure 3.5 Gather stage	50
Figure 3.6 Manage clients	51
Figure 3.7 Statistics gathered using the Instagram API Console and the tags/search <i>highline</i> over the first half of 2015	51
Figure 3.8 Inventory stage	52
Figure 3.9 Sample of queried data from the Instagram API Console	53
Figure 3.10 Sample page of the dataset	54
Figure 3.11 Analysis stage	55

Figure 3.12 Photo categorization flow chart	56
Figure 3.13 Sample page of the coded dataset	58
Figure 3.14 Codebook collection	58
Figure 3.15 Processing the photos	59
Figure 3.16 Hand labeling the coded photos and placing each in the representative bin	59
Figure 3.17 Reconstructed map of the High Line	60
Figure 3.18 Mind Map of the relationships between the seven Activity categories using Scrapple App	63
Figure 4.1 Primary findings categorization using Mind Map software	70
Figure 4.2 Image examples of the Not Applicable category	70
Figure 4.3 Image examples of the Non Park category	71
Figure 4.4 Image examples of the Other category	72
Figure 5.1 Image taken by the researcher on the High Line in the spring of 2015	89
Figure 5.2 Locational outcome identified during this study	90
Figure 5.3 The two locations	90
Figure 5.4 Mapping the tagged results with the locational attributes of 55 percent of the query	92

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To my committee members, this journey has been a collective effort deriving from a well-rounded knowledge base capable of guiding, critically analyzing and refining my work.

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DEDICATION

To Maya and Charlie, may you always follow your dreams.

To Corey, my constant editor, this thesis would be emotionally and intellectually incomplete without you.

An aerial photograph of a city street, viewed from a high angle. The street is lined with buildings and trees. A brown rectangular overlay covers the upper portion of the image. Inside this overlay, the text "CHAPTER 1: INTRODUCTION" is written in a white, serif font. The text is positioned on the left side of the overlay, with "CHAPTER 1:" on the top line and "INTRODUCTION" on the bottom line. The background image shows a street with cars, pedestrians, and buildings. The overall tone is somewhat muted and grainy.

CHAPTER 1: INTRODUCTION

VIEWING THE LANDSCAPE: TRANSITIONS IN TECHNOLOGY

All technology extends and amplifies some pre-existing human urge or condition: a hammer extends the hand, a pencil extends the mind, a piano extends the voice. Technologies become viral when they amplify something that is already in us, but blocked.

- Jonathan Harris, *The Human Face of Big Data*¹

Introduction

I wandered on to the High Line as a visitor to New York City. As I sat on oversized, benches of reclaimed teak and marveled at the juxtaposition of steel softened by overhanging tufts of native grasses, I knew the park, located in the Meatpacking District, was exceptional both in design and experience. I did not snap photos with an iPhone or report my visual happenstance via Instagram. My visit occurred in 2010 at the edge of an era of technological advancement. My encounters were left in my mind and encapsulated through the use of a digital camera.

One of the images I captured in 2010 was from within the park looking toward West 14th and Gansevoort Street. On the left hand side of the photo a garbage truck had stopped for collection as a black car passed by slightly hidden from view; on the right hand side of the photo, elevated 25 feet above the street, steel and concrete met native plants. While I can speak to this experience and explain that the view of lower Manhattan below evoked a moment worthy of snapping a photograph, these thoughts end with my image. The image illustrated in Figure 1.1 became another item in my collection of landscape photographs, an archive that is rarely shared with others.

In the spring of 2015, I visited the High Line again to engage in an informal photographic inventory of the site. This time I was equipped with a smart phone and the Instagram App. Again, I stopped and admired the steel bed and the city beyond the Gansevoort overlook. And again, I was compelled to snap a photograph (Figure 1.2). But, this time, I also shared some of the images of my walk through social media. It was no longer stored on a computer disk or saved in a scrapbook of personal memories. The photo was forever attached to the High Line, “visually chronicled and preserved in a vast cloud-based database.”²



Figure 1.1 Photograph taken by the researcher in 2010



Figure 1.2 Photograph taken by the researcher in 2015

Unfolding Questions

A number of questions arise from attempting to position the importance of visual technology as a tool to understand the public domain. Are the people in the built environment capturing and sharing images through new visual technologies? Are there hidden patterns or commonalities that could surface through an investigation of these new visual technologies? Would the results have a positive impact on the way practitioners design space? The intent of this study attempts to answer these questions by looking at **how Instagram can be used to gather user perceptions about the built environment.**

Instagram allows access to the vast cloud if permissions are granted. Through visual social engagement, others can connect to our shared histories and further record their preferences through likes and comments. And each image the public collectively gathers about the built environment has the potential to transcend its ephemeral nature and become a visual sounding board, allowing landscape architects to learn about the built space. This vast set of data capable of being queried has the potential to be extrapolated to find commonalities or hidden patterns among and between the collected images.

Understanding today's social patterns calls upon the need to understand the history of the built space and the technological movements, which have graced the field of landscape architecture. This study is applicable to the field of landscape architecture as it positions itself in a long history of understanding perception and how to enhance the public domain.

Visual social media is a new frontier for detecting the public's perceptions and revealing the unconscious thought processes that have historically seeped into our genetic conditioning. Records in the 1600s made mention of painters such as Claude Lorrain, Nicolas Poussin and Pieter van Laer accompanying one another on sketching expeditions in order to observe and capture nature.³ These studies ranged from quick, conceptual sketches to detailed renderings of the surrounding elements. Lorrain worked to perfect his talent of recording natural phenomenon. In the studio, he interjected these works with his idealized cognitive images of the landscape. Perhaps it was the combination of effort and vision that helped landscape paintings to transcend all other genres of the time; and led amateur painters and the first tourists to a similar experience.

The Claude Glass, the highly sought after gadget of the day, was the tool that allowed a quick visual recreation of a Lorrain painting. The tool was a handheld obsidian glass that allowed viewers to experience the natural phenomenon of the landscape through a filtered view shed. The Claude Glass did not capture images

permanently. But in an era void of modern communication, the technology was an immensely popular personal apparatus. It has been considered the historical counterpart to the iPad.⁴

From observing to capturing and sharing, the activities associated with experiencing nature have remained the same. The differences lie in the technology of the age. Today, Instagram offers the public the opportunity to capture and share, as well as view images uploaded by others. The result for design practitioners is one large online scrapbook of each built space.

With the new technical capabilities to harness this data lying at the fingertips of the design field, what can this layer of visual information say about created space? Are patterns in the landscape unnoticed by the conscious eye revealed through visual technology? And will this tool be powerful enough to inform opportunities and constraints in the environment? Instagram is viral. It is changing how people interact with the environment. And by pioneering the developer-side of Instagram for practitioners, this thesis offers insight on pedestrian influence delivered through the design of a new tool for visualizing the built environment.

ENDNOTES

1 Smolan, Rick, and Jennifer Er Witt. The Human Face of Big Data. Sausalito, California: Against All Odd Production, 2012.

2 Smolan, Rick, and Jennifer Er Witt. The Human Face of Big Data. Sausalito, California: Against All Odd Production, 2012.

3 Claude Lorrain the Complete Works. “Claude Lorrain (Gellee) Biography.” Claude Lorrain the Complete Works. 2002. <http://www.claudelorrain.org/biography.html> (accessed June 23, 2015).

4 Morris, Mark. “iPastoral.” Architectural Design (John Wiley & Sons, Ltd.) 83, no. 3 (2013): 106-111.

An aerial photograph of a city street, likely in New York City, showing a grid of streets and buildings. A large, semi-transparent brown rectangle is overlaid on the upper portion of the image. Inside this rectangle, the text "CHAPTER 2: BACKGROUND" is written in a white, serif font. The street below shows cars, pedestrians, and trees. The overall image has a grainy, high-contrast aesthetic.

CHAPTER 2: BACKGROUND

TECHNOLOGY AND THE LANDSCAPE: A FOUNDATION ROOTED IN VIEWING AND THE EVOLUTION FROM CAPTURING TO SHARING

Introduction

This research examines the question: how can Instagram be used to gather user perceptions about the built environment? The foundation for this hypothesis is grounded in a progressive, historical framework of the connections between technology and the landscape. As viewing the landscape has evolved from capturing to capturing and sharing, the public's enthusiasm for using tools to view the landscape has grown. The tools and the use of the tools to view and capture images of the landscape offer validation for the exploration of this study to inform landscape architectural practice.

A History of Visual Technological Tools for Viewing the Landscape

The framework of Instagram's visual social media technology is rooted in a rich history of viewing and recording observations of the landscape. The first recorded observations of viewing landscapes stemmed from an era swept up in the Romanticism movement and the tools from this bygone time have continued to evolve. While the instruments have changed from on-site personal observations through convex, obsidian glass to quickly capturing and sharing photos through Instagram, the objective to experience the landscape has not. Viewers of the landscape continue to be connected through the common threads of viewing, capturing and sharing capabilities. The more intriguing change is how researchers can harness the tools of today to impact the landscape practitioner. This chapter highlights the technological progression, an evolution of viewing, capturing, analyzing and sharing the landscape as well as the research behind the tools.

Painting and Viewing the Landscape: Claude Lorrain and the Claude Glass

Late 18th and early 19th century England was occupied in a revolt against order. The "naturalness" permeating through the country was reflected in the arts and seeped into the designed landscapes of the time.¹ Inspired by the Picturesque, artisans looked to nature as a source of beauty tamed by the ownership of man.²

The British social class embraced the emerging Romantic Movement with the help of artistic pictorial investigations of the surrounding landscape.³ The

revolution was not led by artists of the time, but the influences created through the works of landscape painters, such as Claude Lorrain, were highly influential with the public. By the end of the 19th century, the landscape paintings of Claude Lorrain were considered the dominant genre of the time.⁴ Lorrain's work consisted of sketching representational components of light and shapes as natural phenomena in the field.⁵ Through a methodological evolution, Lorrain painted landscapes with a constructed series of images that were then further enhanced and the perspective and lighting manipulated in order to create an increased aesthetic viewer experience.⁶

Claude Lorrain's work is highly regarded as an integral aspect of the history of landscape architecture.⁷ The vividness of Lorrain's work and his ability to capture the landscape in a pre-technological world is still admired by today's design professional and art connoisseur alike. Lorrain's true genius can be found in his nature compositions. Lorrain had the ability to quickly sketch his observations in the field, and then processing his fieldwork into multiple compositions in the studio. His use of portions of his sketches over and over again is akin to use of today's digital camera. A single view can be captured at various times throughout a day to reveal differing visual experiences.

The Liber Veritatis, or "Book of Truth," is a collection of 195 landscapes, figures and elements of nature dating from approximately 1635 until Lorrain's death in 1682.⁸ While the book functioned as a visual ensemble for clients, the highly detailed drawings in the book served as a recorded point of reference for future works created by Lorrain in the studio. The images in the Liber Veritatis are based upon three background scenes of Tivoli, a highly traveled Roman retreat for tourists and artists. These images, illustrated in Figure 2.1, 2.2 and 2.3 were fashioned by Lorrain with the only known reference point being the Liber Veritatis. While the foreground in each of the scenes, as well as the figures, varied, the repetitive act of capturing the shapes, forms and views of nature and reusing foundational points through the use of a detailed book was unheard of in seventeenth century art.

The series of Liber Veritatis paintings spanning over a period of two years is one example of Claude Lorrain's ability to recreate the natural world with the final production enhanced in mood and motif. This ability to depict pictorial scenes was embraced in the Romanticism period by artisans and the first "tourists" looking to capture a similar view.⁹ They were able to do so through a new tool whose intent was to enhance a scene visually: the Claude Glass illustrated in Figure 2.4. The Claude Glass was a black, convex handheld mirror used to distort the landscape by squeezing the visual image and filtering the reflected light.



Figure 2.1 *Landscape with Tobias and the Angel*, 1642.
Pen and brown ink with brown wash and white heightening on blue paper



Figure 2.2 *View of Trivoli at Sunset*, 1642-44,
Oil on canvas. Fine Arts Museum of San Francisco



Figure 2.3 *Ideal View of Trivoli*, 1644,
Oil on canvas. New Orleans Museum of Art

Today the device has regained popularity in anthropological and artistic studies due to its similarity to today's modern counterpart, the iPad.¹⁰ Both are handheld devices of framed glass. When the iPad is not in use, the glass is black and the physical similarities between the two are more prevalent. But, the primary similarities, between both devices, goes beyond the physical makeup. The visual distortion or filtered enhancement, as illustrated in a modern recreation of a Claude Glass is illustrated in Figure 2.5. The landscape is the created image the Claude Glass displays and the filter is one of the capabilities of the glass as well as one of the functions embedded in the iPad camera.



Figure 2.4 Examples of the Claude Glass

The Claude Glass allowed amateur artisans and observers the ability to replicate picturesque landscape beauty through a mirror without a high level of artistic ability. While the Claude Glass did not capture, as it was a pre-photographic invention, the device served as an instrument for artists to record or reconfigure rural scenes. Travelers of the time could use the instrument as a viewing medium.¹¹ "Touring Stations," or predetermined locations where the landscape views exemplified the picturesque, were included on maps of locations in Britain, Europe and North America. Mirrors were available at opticians, stationers, art suppliers and tourist stops. Viewers were told to "turn their backs to the scene, hold up a Claude mirror, and look at the framed and transformed view."¹² Just as Claude Lorrain used frame lines in his nature studies to control the composition, the glass spatially

compressed images offering a structured visual replication.¹³ The consolidated objects that appeared in the glass offered observers a simpler, filtered look as a complex landscape.

Views through the Claude Glass were enhanced by the unified form and line of the visual display making scene recreation much more accessible.¹⁴ For the advanced observer, the Claude glass enriched descriptive narratives of the picturesque. William Gilpin (1724-1804), most notably known for his written collections on picturesque beauty, recorded his observations on a carriage ride while viewing the landscape through a Claude Glass. His insights on the view were recorded in *Remarks on Forest Scenery* from 1791.¹⁵



Figure 2.5 A distorted view of a lake at Derwentwater, The Lake District, England

Gilpin's perceptions, an 18th century method of viewing, capturing and sharing the landscape is described in *The Transient Glance: The Claude Mirror and the Picturesque* as:

A succession of high-coloured pictures is continually gliding before the eye. They are like the visions of the imagination; or the brilliant landscapes of a dream. Forms, and colours, in brightest array, fleet before us; and if the transient glance of a good composition happen to unite with them, we should give any price to fix, and appropriate the scene.¹⁶

Observations with a Claude Glass were just that, observations. Documenting the landscape required either verbally transcribing one’s perceptions or developing sketches into paintings. It was not until the introduction of the photography in the 1820s and 1830s that etched portrayals of the visualized landscape gave way to more accurate and permanent documentations.¹⁷

The Camera: Capturing the Landscape

Unlike the Romanticism Period when Claude Lorrain captured nature and the landscape, the first subjects of the newly introduced cameras in the early 1800s were great works of architecture. The extended exposure time of the new technology did not suffer blurred results with the immobility of the building scape.¹⁸ And just as paintings gave way to tourism, the still life of architecture followed a similar succession. With the advances of the camera alongside the improvement of transportation, tourism was again touched by the evolution of technology. By the mid 1800s, Francis Firth was using the new invention to create photography travel guides canvasing the architecture and landscapes of Egypt, Syria and Palestine.¹⁹

Photographs were an expensive endeavor. From the mid 1800s until production of the first instant camera in the 1960s, the cost of equipment, combined with the purchase of film and processing made the use of photography unaffordable for the majority of the population.²⁰ In 1984, technology enthusiasts were being introduced to the first portable computer, which was followed by the development of the digital camera. The first prototype was an analog-based handheld unit. It recorded still images on floppy disks and played them back on the television or computer monitor.²¹ This consumer analog model was made available in 1981 and followed by the first true digital consumer camera in 1988 by Fuji. Access to digital cameras transformed public perception of photography. Images could be taken, stored or deleted easily at no additional cost. Rather than focusing on the perfect shot with the film camera, digital photographers could experiment and shoot images until the desired view was captured. In addition, another advancement in technology during the 1980s was breaking new barriers. The first portable cell phone arrived to the consumer market in 1983. The Motorola DynaTAC 8000x was used by a limited market sector with the main functionality, to talk.²² Phones moved from single functionality to multimodal and the first true camera phone was offered in the United States in 2002.²³

Today, computers and the internet have created layers upon layers of transparent data accumulated and stored for the masses. Big data is not only the collection and analysis of information, but it is also the transformative thread

allowing once passive information to come alive.²⁴ And while “the average person today processes more data in a single day than a person in the 1500s did in an entire lifetime”²⁵ the devices used today are similar in fashion to the handheld options of the past.

The Captured Image: Understanding Perception in the Landscape

“Perception is viewed as not merely dealing with information about the environment, but at the same time yielding information about what the possibilities are as far as human purposes are concerned.”²⁶The development of devices over time also contains a symbolic thread. Technologies drive the creation of tools and the tools, in turn, drive researchers to understand how humans connect to or give meaning to the built environment. While perception of our surroundings is intrinsic in the genetic makeup of humankind, understanding perception to help learn about the built environment has a shorter history.

Photography has been used in three primary ways to understand user perceptions: viewer preferences, visitor employed photography, and time-lapse photography. The Kaplan visual perception model of coherence, complexity, legibility, and mystery paved the way for studies on perception in the field of landscape architecture (Figure 2.6).

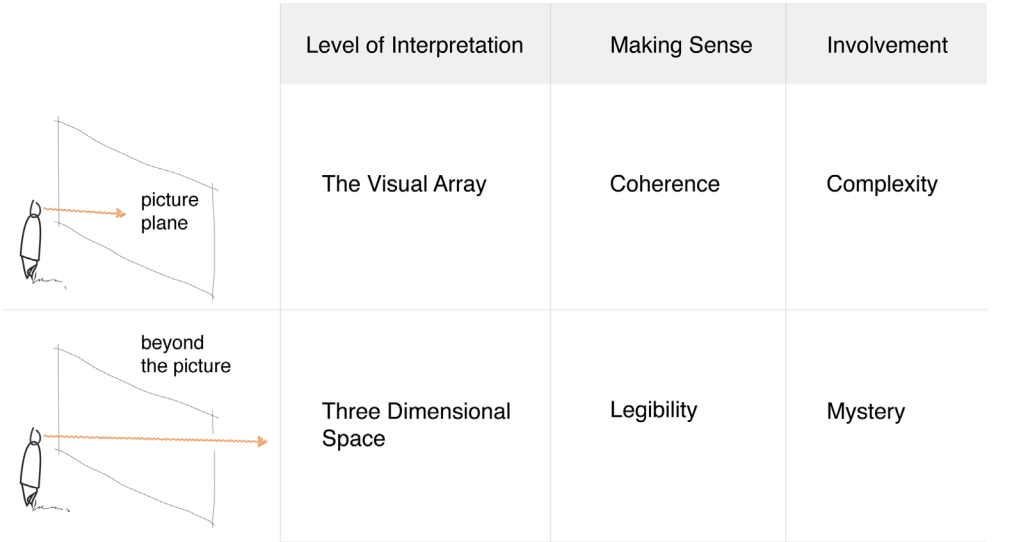


Figure 2.6 Modified Kaplan Matrix

Understanding individual preferences has been further broken down to purpose: “making sense” and “involvement.”²⁷ Making sense of one’s surrounding in the natural environment deals with the human desire to comprehend the space and involvement pertains to the rich possibilities the space can afford.²⁸

Through their research, the Kaplans found responsive patterns present in how people view an outdoor space. Viewers react to the visual array or the two-dimensionality of space as well as to the potential patterns in the three-dimensional space. “The idea of the visual array is easiest to think of in terms of a photograph of any given landscape. The pattern of light and dark on the photograph, the organization of the “picture-plane,” constitutes the basis of this level of analysis.”²⁹ The coherence and complexity of a landscape are the two portions of the Kaplan matrix viewed two-dimensionally or as a photograph. Mystery and legibility of the space is three-dimensional in nature.

Kaplan’s research made seeing beyond the picture-plane a comprehensible idea. Other research gravitated toward imagery and understanding how people see landscapes and the built environment. For example, one study addressed the viewer preferences for a road corridor in southern Utah. The study was conducted to gather insight on the public’s perception of scenic beauty for a portion of road falling in the National Park Service as compared to a stretch of road falling into the USDA Forest Service. The study utilized a series of 35 mm color slides reviewed by a panel of experts for three landscape/scene variables: depth of view, proportion of road in view, and proportion of open meadow in view.³⁰ The road corridor study methodology was based upon the past works of Ervin H. Zube, who referenced the contributions of the Kaplan research to the field of landscape architecture as well as the National Parks Service.³¹

Over the last fifty years, a number of methods for using photographs to understand user perceptions and preference have been developed. While some studies have relied on sifting through images collected or taken by researchers, others reduced the administrative tasks prior to analysis of perception studies.³² Cherem first explored the idea of observers taking the photographs to be assessed. This alternative methodology, visitor employed photography (VEP), was explored in the 1970s as a way to collect and investigate the visual quality of the landscape.³³ Cherem was interested in identifying what the observer would photograph. Hikers were given cameras and asked to take pictures as well as jot down the reason why each photograph was taken.³⁴ The commonalities between hikers’ photos were then assessed.

VEP has not become a widely used methodology. However, it is relevant to explore the idea of handing cameras to a selected audience and asking them to take photos of a particular park, trail, or scenic stop. The idea behind VEP offers insight to researchers looking for directional, scholarly background for current research methodologies. And what is accomplished in this study, exploring the capabilities of Instagram’s accessible data to instruct how users perceive built space, can be traced back to VEP.

Other experts have employed time-lapse photography and note taking. William Whyte’s research for the New York City Planning Commission in 1969 used observational methodologies of capturing and documenting pedestrian movement and “street life.”³⁵ His work offered insight into human interactions in the built environment and he held the power of observation in high regard. As stated by Project for Public Spaces, “Whyte believed, we can learn a great deal about what people want in public spaces and can put this knowledge to work in creating places that shape livable communities. We should therefore enter spaces without theoretical or aesthetic biases.”³⁶

Whyte’s work employed direct observation, time-lapse photography and interviews. In his book, *The Social Life of Small Urban Space*, these methods were explored in-depth and began to reveal spaces that worked as well as those that did not. Learning about the “whys” of urban space helped to create a foundation for future practitioners to draw from.³⁷ Why did people attract more people? What are the minimum and maximum seating dimensions that are deemed “usable”? And how does the idea of comfort play into the creation of outdoor space? Through multiple observations with still cameras, movie cameras and notebooks, Whyte’s methodologies were capable of being objective and measurable.³⁸

Today, people are capturing and sharing their own images of the built environment. The predominant platform for sharing images is Instagram. It extends our ability to display our preferences by allowing each individual an uninhibited experience collecting and distributing photographs via the web. Visual technology opens up a new and unbiased horizon to pioneer. The smart phone and the uploaded image have the potential to be a powerful tool for understanding built spaces.

Research of visual social media is at an introductory stage of development. Educational institutions, such as MIT’s Computer Science and Artificial Intelligence Laboratory and Arizona State University’s computer science department, have been analyzing social media content to understand what people are taking images of and what is popular. The foundation for this research can be traced back to computer imagery studies of 2000.³⁹ Prior to Instagram’s explosion on the social

web, researchers took an interest in photographic recognition of facial and object exploration.⁴⁰ The mental imagery of faces and places compared to visual imagery of faces and places was explored to determine what happens in the brain when a physical image is displayed versus the conjuring of a mental image, where a portion of the results from the multi-portioned study revealed greater neural activity in perception.⁴¹ By 2011, scenic attributes of photographs joined the research compendium. A total of 14,000 scenic images were studied at Brown University where crowd-sourcing was used to create a taxonomy of attributes spanning 700 categories.⁴²

Prior to visual social media research, the majority of academic studies of social media focused purely on textual content found in Twitter.⁴³ According to Michael Zimmer and Nicholas John Proferes, whose work looked at the content analysis of 382 academic publications between 2006 to 2012, Twitter was the “zeitgeist of the internet.”⁴⁴ Scholarly research conducted using methodologies seeped in extracting sentiment patterns from the tool, was the first wave. In 2010, the initial release of Instagram was shared with the world and by 2014, a shift of interests to include images in social media examinations was beginning to take hold in the computer science research community. At MIT, researchers looked at which images prevailed over others. The Computer Science and Artificial Intelligence Laboratory, by looking at image content and social indexing, was able to create the “Popularity API.”⁴⁵ The Application Programming Interface, API was created to provide educational and academic opportunities for researchers to examine their images. The API is the technological liaison between two differing software platforms. In the terms of the Instagram API, it is a console where “calls” to action can take place to query information about Instagram, usually for the creation of a stand-alone or third-party application.

Arizona State University’s computer science department has also been involved in some of the early visual social media research. The popularity of Instagram as a new source for insight into social, cultural and environmental issues, was addressed at the Eighth International AAAI Conference on Weblogs and Social Media in the paper What We Instagram: A First Analysis of Instagram Photo Content and User Type.⁴⁶ The findings of the cutting-edge research, illustrated in Figure 2.7, used the Instagram API in conjunction with computer vision techniques, clustering and human coding to reveal eight popular photo categories, see Figure 2.5. The eight categories: friends, food, gadget, captioned photo, pet, activity, selfie and fashion were used as the foundation for coding Instagram photos in this research.

Working with the framework created at Arizona State University, this study was refined and narrowed to focus on the analysis of landscape images. The process

resulted in the development of a technological tool, dCODE, or design code. The tool was a means to an end. While other studies look at visual social media to answer questions about what people were Instagramming, the idea of taking this information and revealing hidden patterns and commonalities within the general public’s images of the landscape had not been developed.


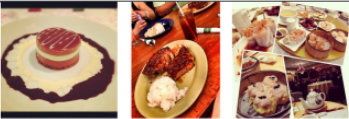


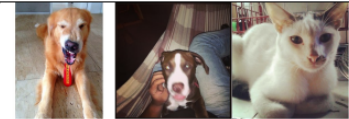

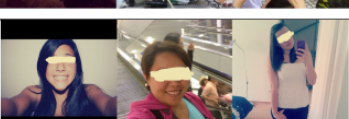

Category	Exemplary Photos
Friends (users posing with others friends; At least two human faces are in the photo)	
Food (food, recipes, cakes, drinks, etc.)	
Gadget (electronic goods, tools, motorbikes, cars, etc.)	
Captioned Photo (pictures with embed text, memes, and so on)	
Pet (animals like cats and dogs which are the main objects in the picture)	
Activity (both outdoor & indoor activities, places where activities happen, e.g., concert, landmarks)	
Selfie (self-portraits; only one human face is present in the photo)	
Fashion (shoes, costumes, makeup, personal belongings, etc.)	

Figure 2.7 Eight categories from *What We Instagram: A First Analysis of Instagram Photo Content and User Type*

POST OCCUPANCY EVALUATION: ASSESSING THE VISUAL QUALITY OF THE LANDSCAPE

Post Occupancy Evaluation: An Overview

The Post Occupancy Evaluation (POE), is intended to collect and disseminate data about a built environment. While the methods and deliverables can vary greatly, some of the overarching use cases look at the POE as a way to: “apply design skills more effectively, improve upon the commissioning process, improve user requirements, improve management procedures, provide knowledge for design guides and regulatory procedures, and to target refurbishment.”⁴⁷ The definition of a POE can also fluctuate greatly between industries as well as specific situations. For the purposes of this thesis, the human condition is the focal point and the term POE refers to “examinations of the effectiveness for human users of occupied design environments.”⁴⁸

Photography has been used as a method to aid in the landscape architects’ understanding of the natural environment. Both assessing the visual quality of the landscape and looking at perceptions on corridor dissection within our park systems have been further examined with the help of the camera. The developers of built environments have also relied upon photography to help gather information about architecture and the landscape to determine overall performance.⁴⁹

According to the Federal Facilities Council, the POE first surfaced in the late 1960s as a solitary case study evaluation and by the 1970s the POE had evolved into a multifaceted methodology.⁵⁰ The POE can consist of a composition of tools to produce findings related to the operations and performance of an implemented building or landscape. POE’s can also include human factors such as the satisfaction level of the end user.⁵¹ With no set standards for data gathering, the POE has the potential to be an elusive endeavor. Low adoption rates for the POE process have been attributed to high costs and high time consumption resulting in unbiased deliverables difficult to convey to a client.⁵²

Despite the challenges, the benefits of improving the built environment by increasing occupant comfort and reducing costs have continued to impress upon the industry the importance of incorporating strategic POE protocols into the business model.⁵³ New technological advances, such as integrating Instagram into the POE, have the ability to cut costs and introduce uninhibited results.

Post Occupancy Evaluation: the Smart Phone and Instagram:

Relying upon the human user can be tricky. Which users should be studied and what type of application should be used all weigh heavily on the design of a POE. In the 1980s, Zimring and Reizenstein termed the POE as rudimentary and inconclusive at best. Their conclusions touched on generality, breadth of focus and applicability. This thesis addresses adapting the idea of the POE as a broad sampling of space and time by reaching a larger audience through visual social media data capture. The study also looks to the time management issues of the POE. In 1980, the estimated turnaround time for practitioners completing a POE in an office setting was a few weeks; and, with government agencies, a couple of months.⁵⁴ In order to meet deliverable timelines, POE examiners were lacking in either the breadth of the study or the delivered report.

These challenges remain in more current examinations of the POE process. In 2006, David Whitemeyer introduced the idea of “Anthropology in Design.”⁵⁵ His approach to the POE used observational methods regarding how people felt about a space. The problem with this method was the subjective nature of the results offered little in the way of a reliable measure of the space in question. Today, practitioners are still concerned with the generality, breadth of focus and applicability and thus are slow to adopt the POE as a learning tool.⁵⁶ But how to contend with these issues has the potential to change. This thesis touches on the idea of the observational method, but quantifies the hidden patterns or commonalities of a larger data set than normal POE standards would allow with regard to the constraints of time and money. In addition, the research subjects in this study do not know they are the subjects. Therefore, any bias or inhibited accounts of the environment are removed.

A foundational framework is needed to address the unfolding technological advances and practices in place of designing with people in mind. With the technology and research of Instagram still in its infancy, determining whether or not public captured and shared images will have a greater value add to the profession requires more research and a longer maturation period. From the standpoints of employed time and cost as well as biased results, the post occupancy evaluation has been a framework riddled with obstacles and slow adoption rates. Adding a new uninhibited tool to the framework could prove to be a positive amendment or even a stand-alone evaluation option.

Digital Media: Potential Impact on POE

The digital age is just beginning to be incorporated into the array of tools used by practitioners administering POEs. Web-based surveys are cutting down on cost, time and rich text formatting.⁵⁷ Geographical information systems (GIS) also have begun to play a role in the data influenced POE world. Andrew Louw, a former research assistant for Landscape Architecture Foundation's Case Study Investigation, has been utilizing a digital data collection method for POEs in his scholarly research.⁵⁸ Louw is evaluating the implementation of Facilitated Volunteer Geographic Information (F-VGI) as a method for analyzing post-occupancy landscapes. VGI involves the various practices of observing, collecting and producing geographic information systems by the general public with no advanced knowledge in the field.⁵⁹ Facilitation further enhances the technology by allowing the researcher to define mapping limits and set criteria.⁶⁰ This thesis follows a similar technological vein.

DIGITAL MEDIA, INSTAGRAM AND THE HIGH LINE: NEW TOOLS FOR ASSESSING THE BUILT SPACE

Instagram

"Instagram is a fast, beautiful and fun way to share your life with family and friends."⁶¹ Instagram was an overnight sensation. On October 6, 2010, Stanford University graduates, Kevin Systrom and Mike Krieger, launched Instagram, a mobile photo sharing application. Success was almost instantaneous, with a 25,000-user signup the very first day, quickly expanding to 3.75 million by May 2011.⁶² During 2012, the founders sold the free app to Facebook Inc. for \$1 billion in cash and stock. Facebook rationalized the acquisition based on a belief in Instagram's abilities to continue Facebook's exponential growth trend by improving mobile offerings and removing any social media competition.⁶³ By July of 2014, 20 billion shared photos were accounted for with an average of 60 million photos distributed around the globe daily.⁶⁴

Instagram's Potential in the POE Process

Today, Instagram users are able to quickly snap, revise with filters, and share their visual impressions through photographs with a vast array of social networking applications instantly. To date, that list includes Instagram, Flickr, Facebook, Twitter and Foursquare (if an individual photo is geo-referenced).

With 50 million new user accounts created from January to June 2014, Facebook's rationale for their acquisition of Instagram was on target, and the social media application was trending toward a highly successful future.⁶⁵

On the developer side, Instagram released a real-time application programming interface (API) early on in 2011.⁶⁶ There are a multitude of possibilities for a developer with access to an API. Mashable, an online media presence informing the digital generation about the digital age, offered some entry-level advice on what could be accomplished with the resource as well as a basic definition:

For those who have never heard the term before, an API is a seamless software-to-software interface, meaning there is no user involvement during the passing of information. For example, when you enter credit card information to make an online purchase, the website sends your credit card information through an API to another application, which confirms that the provided information is correct.⁶⁷

All social media applications that allow users to capture and share photographs have the potential to be used in POE studies as well as visual perception studies. Instagram seems to offer the greatest potential because of the developer tools combined with the ease of the user interface.

Digital Media: Locating Landscape Architecture

Instagram houses a vast range of photographs. A 2013 Mashable post on Instagram's most popular images revealed the top ten categories as: food; kids; kids and food; screenshots of your text messages; nails and nail art; dogs, cats and other domesticated animals; quotes and word art; your snack; no filters; self portraits.⁶⁸ While these categories were posted for fun, a deeper look at the categorizations and what researchers will find on Instagram was further developed by Hu and Kambhampati's research, What We Instagram: A First Analysis of Instagram Photo Content and User Types. This research created a foundation for sorting and filtering the images in this thesis.

The categorizations of selfies, friends, food, fashion, gadgets, activity, captioned photos and pets helped in the identification process, allowing for the sifting of landscape images from the deluge of photos. A categorization for the term "landscape" in this study would have been difficult to determine without the ability to sort out the non-relevant categories. Images in this study that fell into selfies, friends, food, fashion, gadgets and captioned photos were placed to the side and the set of

photographs that remained in the pool of this study naturally fell into the activity categorization. This category presents a connective thread between the disciplines of computer science and landscape architecture. Computer Scientists define Activity as “both outdoor and indoor activities, places where activities happen, e.g., concert, landmarks.”⁶⁹ In design practice, Kevin Lynch defines landmark in the 1960’s book, *The Image of the City*: “Landmarks, the point references considered to be external to the observer, are simple physical elements which may vary widely in scale.”⁷⁰

The High Line: A Landscape Architecture Landmark on Instagram

Hu and Manikoda’s reference to “landmark” in their definition of the “activity” category provides a link to locating images related to landscape architecture. Landscape architects consider the landmark as an important point of reference in the built environment. Landmarks have the power to relate to other elements of the surrounding geography; and interactions between the landmark and the surrounding built environment can be enhanced or subdued.⁷¹

In 2012, Travel + Leisure released the World’s Most Popular Landmarks list.⁷² Readers were asked to rank descriptive icons in an online survey and state whether or not they had visited the site. The survey, held from September 15, 2011 to October 31, 2011, positioned the High Line, illustrated in Figure 2.8 at number ten.⁷³ The list consisted of the Statue of Liberty, New York; Empire State Building, New York; Golden Gate Bridge, San Francisco; Eiffel Tower, Paris; Big Ben, London; Coliseum, Rome; Millennium Park, Chicago; St. Peter’s Basilica, Rome; Swiss Re Building, London; and The High Line, New York.

The High Line, an easily identifiable 1.45 mile park with a clear linear form constructed on a historic freight rail prominently situated above the city, offers juxtaposition from the city’s hardscape with native plantings, benches, pathways and art. The distinct physical form and unique user experience likely led to the High Line’s inclusion on the list of World’s Most Popular Landmarks. This status is reinforced by the site’s popularity in social media. The High Line opened its first section in June 2009 and joined the ranks of iconic greats, such as The Eiffel Tower and Big Ben, just three years later. The High Line’s success appeared to be as explosive in popularity as the introduction of the Instagram App. The weekend after the ribbon cutting ceremony revealed the first section of the park, 100,000 visitors were recorded.⁷⁴ Two years post opening, the tally of visitors accessing the park reached 4.4 million.⁷⁵

Instagram and the High Line continued to grow in popularity, Instagram showcased the Top Ten Most Instagrammed Places in the World at the end of 2013.⁷⁶ The High Line landed in the tenth spot (Figure 2.9), and was now a virtual landmark archived by thousands of users to be seen over and over again. The Instagram blog released the top ten list in December 2013: Siam Paragon, Bangkok; Times Square, New York; Disneyland, Anaheim, California; Bellagio Fountains, Las Vegas; Disney World, Florida; Staples Center, Los Angeles; Central Park, New York; Dodger Stadium, Los Angeles; Suvarnabhumi Airport (BKK), Bangkok; The High Line, New York.⁷⁷

The High Line: A Site for Studying User Preferences Via Instagram

The High Line, located in the Meatpacking District of New York City exceeded the expectations of a successful site. The physical space reached iconic status practically overnight. The park’s Instagram status of captured and shared photos tagged highline has continued to see growth.

The High Line could have been designed as a prominent powerhouse with little thought or care for the inner workings of the city below. Instead, through thoughtful design and historic preservation, the High Line became a living and breathing landmark. High Line, as a name, echoed from the park as if to reverberate in the minds of the visitors and inhabitants of the surrounding city. The term pinged through the population until High Line became a household name. The popularity of the space, as well as the name, was a part of the rationale for focusing this study on the High Line as compared to a park that might be known by multiple names or hashtags.

The High Line also was selected due to the high regard it has received in the design field. It is considered to be a high quality landscape architecture work. Lisa Switkin, a member of the core design team from James Corner Field Operations summed up what the team wanted to achieve through the design and how the execution has held true.

We had a dilemma: how do we take such an authentic place and make it accessible without destroying it? Our work was a balancing act, and the concept straddled preservation and transformation, hard and soft. We wanted the experience of the High Line to remain informal. Even today, as busy as it is, people still use it in a very casual way, as if it is their backyard. That was the informal spirit that we were trying to hold on to.⁷⁸



Figure 2.8 *World's Most Popular Landmarks*, images 1 - 9 from Spagnolo, image 10 from the Instagram API data query



Figure 2.9 *Top Ten Most Instagrammed Places in the World*, images 1 - 9 from Instagram, image 10 from the Instagram API data query

The High Line embodies Lynch’s definition of a landmark as evidenced in online surveys and the unbiased eyes of Instagram subscribers. Therefore, if Hu and Kambhampati’s Instagram research on modern culture coined the term Activity to encompass landmarks, the High Line, as a landmark, provided a study site to examine a new form of capturing public perceptions of the built environment.

Summary

While the devices people use to view, capture and share the landscape have been modified as technology has changed over the centuries, all the tools people have used hold one transcending idea in common: people have preferences. This study examines how the current visual tool on the social market, Instagram, can be harnessed to collect unbiased and uninhibited preferences of the study site, the High Line.

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An aerial photograph of a city street, likely in New York City, showing a grid of buildings, trees, and a street with cars and pedestrians. A large, semi-transparent brown rectangle is overlaid on the upper half of the image. Inside this rectangle, the text "CHAPTER 3: METHODOLOGY" is written in a white, serif, all-caps font. The text is positioned on the left side of the rectangle, with "CHAPTER 3:" on the top line and "METHODOLOGY" on the bottom line.

CHAPTER 3: METHODOLOGY

RESEARCH QUESTION:

How can Instagram be used to gather user perceptions about the built environment?

SUB-QUESTIONS:

Can a tool be developed to synthesize posts on Instagram in a way that allows landscape architecture practitioners to learn about the built environment?

What would we learn by applying this tool to a real site?

What is the viability of using the tool to inform landscape architecture?

Introduction

The following study is based upon two primary activities: data collection and data analysis as illustrated in Figure 3.1. The diagram outlines specific methods used in the development of a tool for data collection and the application of the tool to analyze data from a real site. The development of the tool derived out of pure necessity. The construction of the tool began at the macro-level of capturing images from Instagram and analyzing the images to understand the built environment. Once the functionality of the tool became concrete through a series of four stages, the tool was tested on a specific site. The micro-levels of analysis required a series of eight steps.

A mixed methods approach was employed to answer the research question and sub-questions, as well as in the creation of a new tool for the design profession. The methods employed both computer processing and manual processes to develop and test the tool. The results of the data analysis were applied to a hypothetical professional project to test the viability of the tool and process.

Exploration of Qualitative Research Tools

In this research, tools such as NVivo and MAXQDA were vetted out through early trials and experimentation with one-off Instagram queries even before the final dates were determined for the study. NVivo was explored the most and proved to be a powerful qualitative tool capable of inventorying and storing the information in a online warehouse, including the majority of information gathered from social media applications. However, the tool proved to have two downsides: it was not capable

of harvesting images from Instagram and the imported dataset was not malleable. If both of these difficulties were non-existent, the tool would have been employed. On a trial run, a series of ten images were imported into NVivo to test the coding and processing. Even though the tool was moving more and more toward not optimal, NVivo allowed each image to be coded on a singular or multiple categories by utilizing simple tools to identify traits in the images. Using NVivo or a similar qualitative data analytics software program would have proven to be a large time saver. However, as this research was so new, it is difficult to say whether or not the hidden patterns and commonalities identified the creation of a tool would have surfaced. Just as landscape architects learn to draw by hand or manually calculate the construction process prior to moving to automated software solutions, taking the time to learn about the process manually while implementing it was essential to the success. Ultimately, the integration of a preliminary digital model would have nullified many opportunities to learn and apply best practices and agile development for future generation build outs.

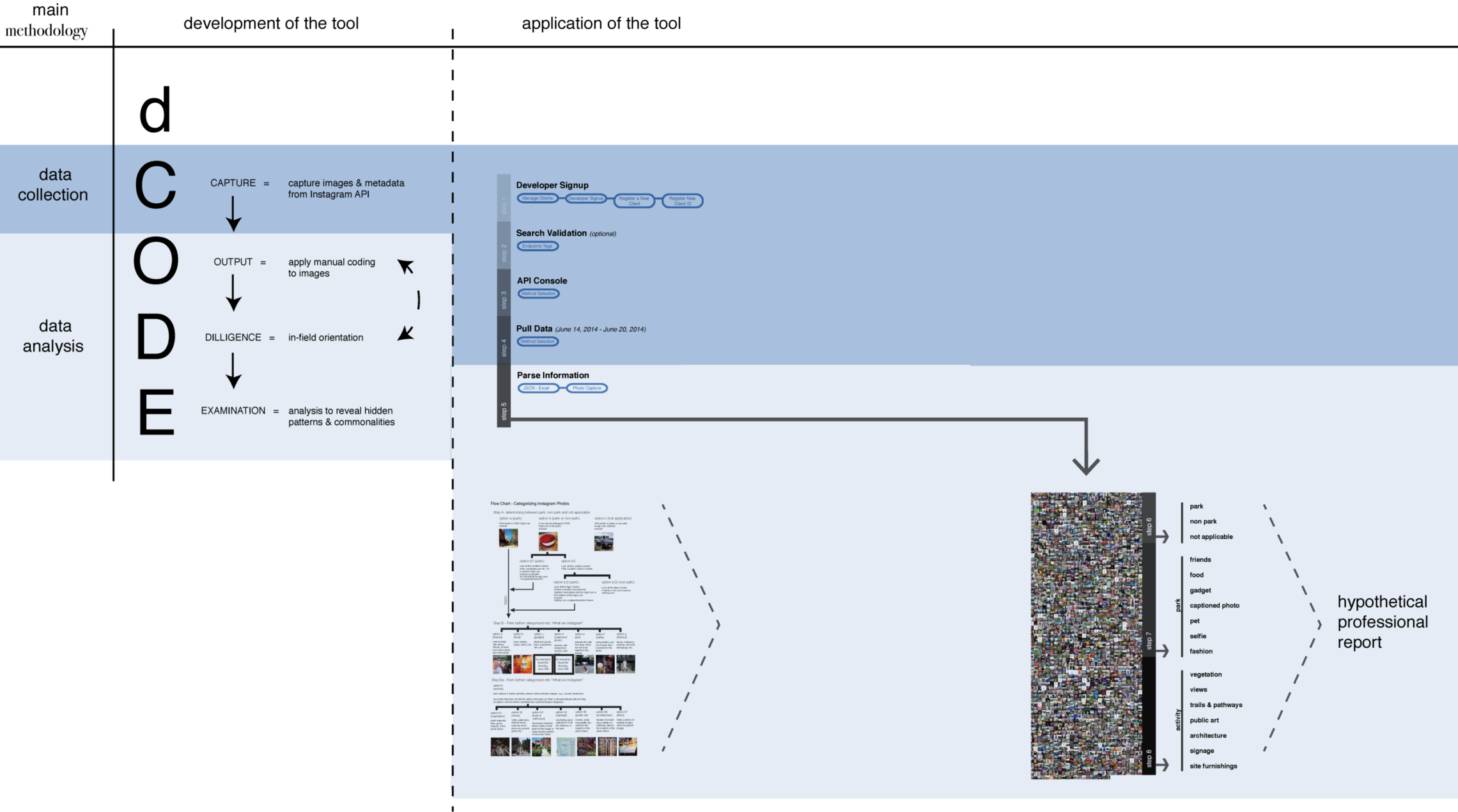


Figure 3.1 Main methodologies diagram

**DEVELOPMENT OF THE TOOL:
DCODE**

In order to determine if Instagram could be used to gather perceptions about the built environment, it was necessary to develop a process for capturing and processing images. Through trial and error, a process was developed that involved: developing an iterative capturing procedure of images and associated metadata through the Instagram API Console; applying a manual coding process to the output of captured images; exploring and orientating the research with in-field due diligence; and, examining the captured images to uncover hidden patterns and commonalities. This four-step process has been named dCODE. The four steps are reflected in the CODE in dCODE: capture, output, diligence and examination, as illustrated in Figure 3.2.

Stage One, Capture

The first stage, capture, involved conducting an iterative examination of the Instagram API Console. The inner workings of the developer side of Instagram were explored though the iterative procedure where refinement and eventual establishment occurred over an eight-month period devoted to the examination of the API device. During this period of time, a series of barriers were reached, examined and worked through to develop the foundation for the querying of the dCODE tool. Some of the barriers were technical in nature, such as determining how best to transcribe the coding language of Instagram and apply it to a functional database for the study. Other obstacles were humanistic: in order for dCODE to be an effective tool, it was necessary to understand how and if people were tagging images prior to uploading them to Instagram. Once the mechanics and anthropological aspects of the API were smoothed out, a basic process was developed to answer the research question and was applied to the API.

Stage Two: Output

For the second stage, output, manual coding was used to query user preferences gathered during the capture stage of dCODE. The first and second steps of the process relied on a mixed methods approach combining computer automation and manual sorting procedures.

Automation was used in replicating queries from the developer side of Instagram to form a data pool and manual sorting was used to refine the pool into a series of categories. In order to adhere to a high level of data integrity throughout the automated and manual work, the contents of the study (all images and specified metadata) were captured, processed and coded according to a codebook created by the author.

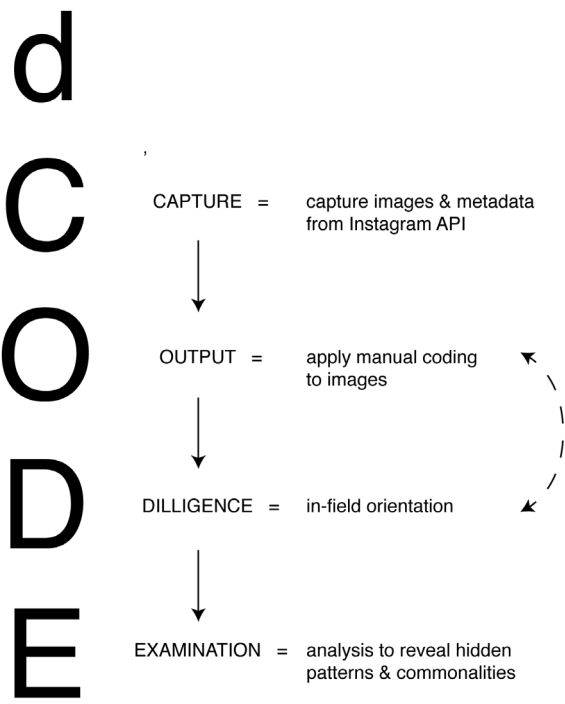


Figure 3.2 Steps involved in the dCODE tool

Stage Three: Diligence

The third stage in the dCODE process, diligence, was designed to answer any questions that arose during the output stage. By completing an informal site inventory and analysis of the High Line, the research gained a level of validity through a system of checks and balances. Each captured and shared image that created doubt about what was either visually depicted in the image, where the image was located on or around the High Line, or both was further explored through the orientation to the High Line during an informal site visit. As illustrated in Figure 3.2, diligence and output are cyclical in nature. Findings from diligence stage affected the results of the human coding and categorization in the output stage.

Stage Four: Examination

The fourth stage, examination, was the portion of dCODE designed to reveal the hidden patterns and opportunities presented through further analysis of the categories. The examination portion of dCODE relies upon manual coding of the activity categories presented in the output stage of the dCODE process. During this last stage, the results of the process reveal opportunities and constraints of the landscape or built space. Questions, such as “how often are these benches used?”, or “are people walking on this trail more often than that one?”, have the potential of being answered through the examination process.

Operational Definitions

Preference

For the purpose of this study, all the subjects in the images captured and shared through Instagram were considered a preference. With the advances, ease and little to no cost input for capturing images, it is not simple to draw a conclusion of preference related to image captured and shared. As stated in the background chapter, when cost and time to operate photographic equipment were high, the images captured revealed prominent elements, usually of architecture. Today, with the luxury of technology, people may or may not give preference a thought. For example, a person in a park does not need to pick between taking a photograph of a rock over a photograph of their family. They have the resources to take both. For the purposes of research, without asking the individual if they preferred the image of the rock over the image of their family, we have no way of knowing their preference. According to Dan Gardner, author of the introduction to *The Human Face of Big Data*:

When people are asked what choice they would make in a certain situation, they are often wrong...Big Data can’t tap into our unconscious thought processes directly, of course. But with a vast storehouse of our past decisions to analyze, it could detect patterns of behavior we are not aware of, and those patterns could reveal the unconscious thought processes that drive behavior. In a very real sense, Big Data could know us better than we know ourselves.¹

This study is not intended to look for individual preference. It is, however, intended to find hidden patterns and commonalities between the masses of captured and shared images. This study can derive the perception and preference of only the collective Instagram audience.

Weather Conditions

Consideration was given to the amount of saturation needed to produce a meaningful study. Observational methods were employed with trial runs executed prior to the final query consisting of one full week. The study ran from June 14, 2014 to June 20, 2014 covering every day of the week, including the weekend.

The 168-hour query was void of poor weather conditions, determined using New York’s Central Park weather station data from the online source, Weather Underground. The selected week recorded a maximum temperature of 89°F and a minimum temperature of 59°F. Precipitation occurred in only one recorded 24 hour period with a light accumulation of 0.15 in. Wind speeds, ranging from 3 to 6 mph were determined to be a normal occurrence for pedestrians using the park and a nonfactor for increased or decreased Instagram activity as 4 mph was the average wind speed recorded for the month of June as broken down with temperature and precipitation by the days of the study in Figure 3.3.²

Day of the Week (2014)	Temperature			Precipitation	Wind Speed
	Mean	Max	Min		
Saturday June 14	67°F	74°F	60°F	0.00 in	5 mph
Sunday June 15	70°F	80°F	59°F	0.00 in	4 mph
Monday June 16	72°F	81°F	63°F	0.00 in	3 mph
Tuesday June 17	80°F	89°F	71°F	0.00 in	4 mph
Wednesday June 18	83°F	89°F	76°F	0.00 in	6 mph
Thursday June 19	73°F	77°F	68°F	0.15 in	4 mph
Friday June 20	72°F	79°F	64°F	0.00 in	4 mph

Figure 3.3 Weather conditions for the week of June 14 through June 20, 2014

TESTING THE TOOL:
dCODE AND THE HIGH LINE

Working with the parameters of back-end development requires an understanding of software, coding and programming. dCODE has the potential to take landscape research to a new level by using back-end development without the need to obtain access from the front-end user, offering an unbiased approach. In order to validate the potential of the tool and all it had to offer, a test park was needed to explore the process in a real-world setting.

The High Line was selected as the first park to test the data collection and analysis tool, dCODE. The four-stages designed and illustrated in Figure 3.1 propose a process. Processing the output related to the High Line gathered on Instagram required a codebook to organize the query, inventory and analysis the results of dCODE applied to the site.

Each stage explored in the dCODE tool; capture, output, diligence and examination was further developed through the mixed methods approach of testing dCODE on the High Line through a series of eight steps illustrated in Figure 3.4.

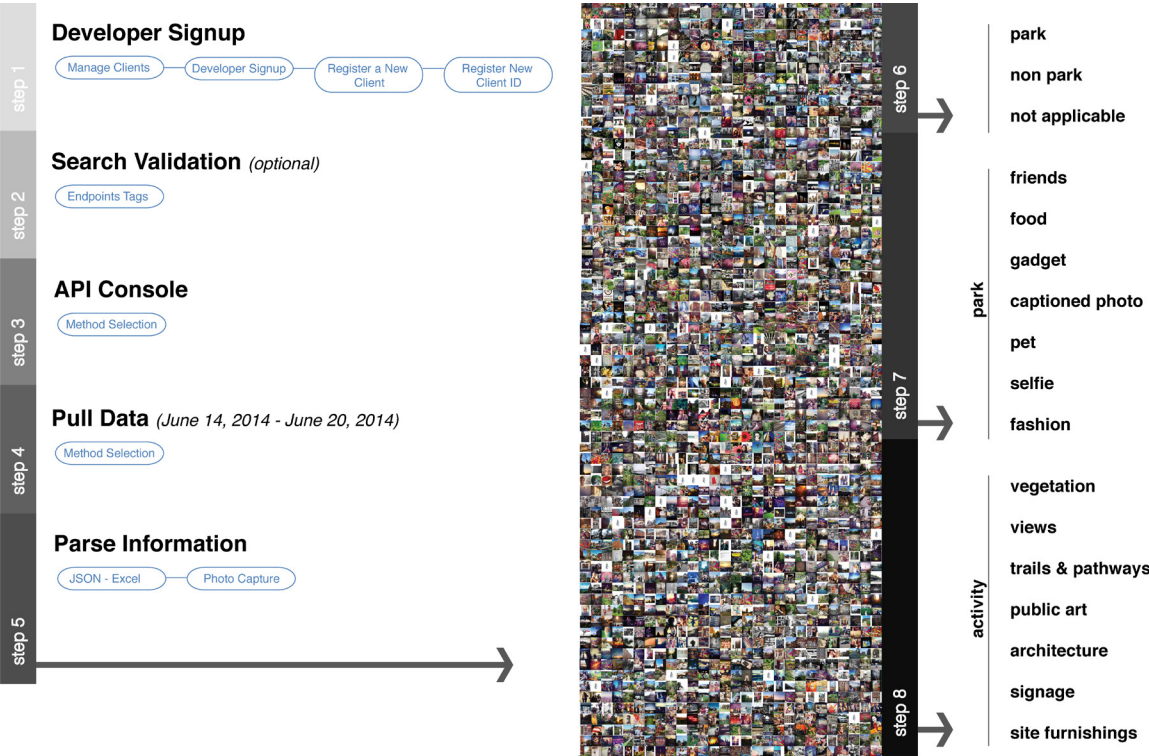


Figure 3.4 Methodology steps

The Codebook

Each step illustrated in Figure 3.2 is further broken down by the terms gather, inventory, and analysis. Steps one through four are illustrated in Figure 3.5 as the gather portion of testing dCODE on the High Line.

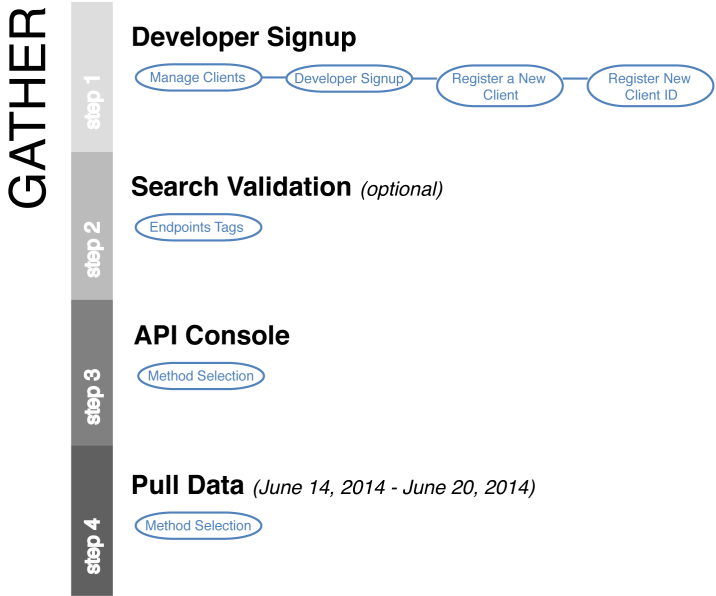


Figure 3.5 Gather stage

STEP 1 Developer Signup:

Prior to gathering any data, developers wanting to use the Instagram API must register a client_id on the “Manage Clients” page. Figure 3.6 illustrates the “Manage Clients” page and the New Client created on behalf of this study.

The developer signup process allows for API Console authenticated requests, which is essential for developers wanting to do more than read data. The Client Secret, a code given to each developer when they register, is blocked out per the security warning provided on the Instagram API Console site.

STEP 2 Search Validation

Once the Instagram API has collected the necessary information from the developer, the developer is then ready to begin making requests of the API. Prior to initiating requests for this study, a quick study was conducted on the hashtag *highline* in order to begin tracking the popularity of the park over time. Step 2 in

Manage Clients

Report Issue Register a New Client

High Line data

DELETE EDIT

CLIENT INFO

CLIENT ID	5e12bf6c3a814c2a815064b3963ce254
CLIENT SECRET	
WEBSITE URL	https://sites.google.com/site/highlineprojectdata/
REDIRECT URI	http://localhost
SUPPORT EMAIL	None

Figure 3.6 Manage clients

Figure 3.5 shows the search validation as optional, but the results increase credibility to the study by looking at how many Instagram photos are tagged *highline* over a set period of time. According to the findings illustrated in Figure 3.7, as of January 3, 2015, a media count of 284, 551 Instagram photos tagged *highline* were returned. On June 29, 2015, approximately 6 months later, the API tags search indicated a 76 percent increase with 371,224 Instagram photos tagged *highline*. The statistics were gathered using the API Console Endpoint GET /tags/search/ which is used by developers to search for tags by name.

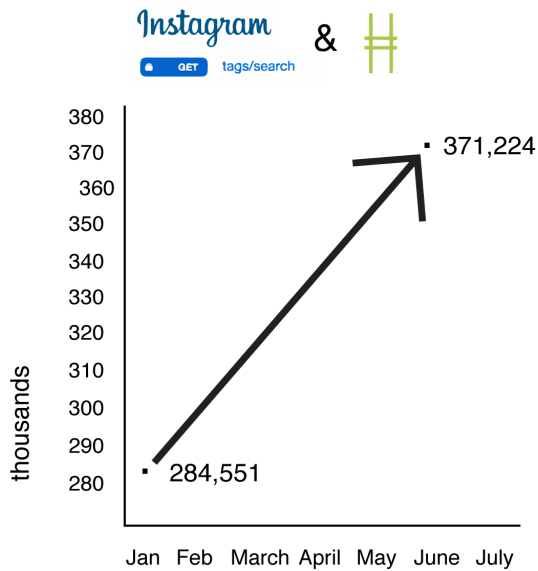


Figure 3.7 Statistics gathered using the Instagram API Console and the tags/search *highline* over the first half of 2015

STEP 3 API Console

Step three, illustrated in Figure 3.5, employed the Endpoint GET /tags/tag-name/media/recent. The Endpoint allows developers to query newly tagged media and associated information from the API Console based upon a tag-name. In this study, the tag-name *highline* was used and the results can be further manipulated with this Endpoint by setting a timestamp parameter for MAX_TAG_ID. The query, by default, will run when ordered and historically post for a cumulative of 20 items.

STEP 4 Query Data

Selecting the data to query was established through a series of trial runs to determine the following: how many images could be queried in a set amount of time using the *highline* tag query; how many days should the query consist of; what time of year and season was the most appropriate; and, what obstacles should be avoided.

The intention of preliminary querying was to help define the data threshold. The conclusion was a one-week study, including a weekend and void of bad weather and major holidays, was the appropriate amount of time for gathering data for the study. However, a one-week query is not a set standard. Each study should be considered on a case-by-case basis as the amount of data has the potential to fluctuate beyond time of day, week or season. Other influences to consider include: site location, quantity of captured and shared images and the endpoint being queried.

STEP 5 Inventory

Step 5 illustrated in Figure 3.8, was the inventory stage of the codebook and includes parsing the data into a spreadsheet to advance the study to the analysis stage. Working with codable language, compiling Excel spreadsheets and harnessing the photos were all essential undertakings in this stage of data development.

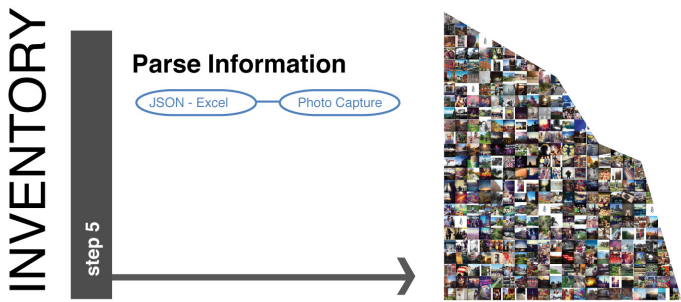


Figure 3.8 Inventory stage

Parsing, or reformatting the data into a readable and workable language was necessary as the JSON language used by the Instagram API Console was not in a readable format for management of the data and the accompanying attributes. When the information displayed, it required a conversion from the JSON language to CSV for all records to be accessed and managed in Excel.

In addition, all photos were queried using the add-on tool in the Firefox browser, *Download Them All!*. Once the photos were downloaded, they were manually imported into the database by gathering groupings of 20 images at a time into a well-defined file management system based on the query. The result of the collection stage concluded with 2,060 photos and their associated attributes over the seven-day query span.

The Instagram API Console has limits to the amount of images that can be queried at one time. The limit is 20 images per query and the inventory stage of the codebook resulted in a 103 queries of 20 photographs. Each image was cataloged by the following attributions: tags, type, location, comments, filter, created_time, link, likes, images, users_in_photo, caption, user_has_liked, id, and user. The photo attribution column was imported manually. Figure 3.9 shows a sample of two photos from one of the 20 photo queries.

[illegible]

Figure 3.9 Sample of queried data from the Instagram API Console

The results of the collection stage were further reduced down to include only the attributes needed for this study: tags, type, location, filter, created_time, link, id, photos, and an additional 4 attributes labeled 1, 2, 3, and 4 for human coding each of the photos. The newly created database was stored on the computer as well as printed and bound into one large black book to be marked up and edited. A sample of a page can be seen in Figure 3.10.

Once the automated query was complete and the data pool was organized with the appropriate level of metadata, the manual sorting of the images began. Each image, in order to cross-check and account for errors during manual sorting, was replicated as a thumbnail image and labeled in reference to date and order placement within the notebooks. Creation of the codebook allowed for an iterative process of






tags	type	location	filter	created_time	link	id	Photos	1	2	3	4
highlife,slacklife,highline,slackline	image		Lo-fi	1402926314	http://instagram.com/p/pTp00kjc62/	744122313213857462_965865882					
beautiful,highline,love,garden,family,june,sunny,raised,walkway,cityscape,lush,newyorkcity,sunday,afternoon,gorgeous,fun,nyc	image		Mayfair	1402926225	http://instagram.com/p/pTpP_GQARa/	744121568602358890_23999096					
empirestatebuilding,highline,niceview	image		Unknown	1402926017	http://instagram.com/p/pTpQKRiN6-/	744119821806919358_1099252102					
highline	image	40.7442393 48 The High Line - 74.0062009 99 3001573	Rise	1402925983	http://instagram.com/p/pTpMddyLw/	744119539625147337_1874653					
beautiful,highline,love,newyorkcity,family,june,raised,fun,sunday,afternoon,walkway,cityscape,nyc,garden	image		Toaster	1402925960	http://instagram.com/p/pTpIouQAQ3/	744119345554129975_23999096					

Figure 3.10 Sample page of the dataset

gathering and analyzing images and data. The notebooks also became a series of logs: entries could be cross-referenced with any thumbnail image for accuracy, which allowed dCODE, to work as intended as a test for identifying opportunities and constraints in a landscaped design.

STEP 6 ANALYSIS (park, non park, not applicable)

The analysis portion of the codebook relied on the human coding of each of the photos into categorizations as defined in Figure 3.11. The analysis was determined based upon the criteria listed in Figure 3.12.

Step A in the Photo Categorization Flow Chart Figure 3.12 was to take each photo and determine whether it belonged to the park or not. Photos were classified as Park (P) if it was 100% High Line. If the photo could not be determined or identified through manual visual analysis, such as the case of the whoopee pie photo in Figure 3.12, the *location* column was the second determining factor. If the *location* attribute placed the photo on or near the High Line, the photo would fall into the Park category. If the *location* attribution column was blank, the third in line determining factor was the *tag* attribution. If another word beyond the tag *highline* were present

ANALYSIS

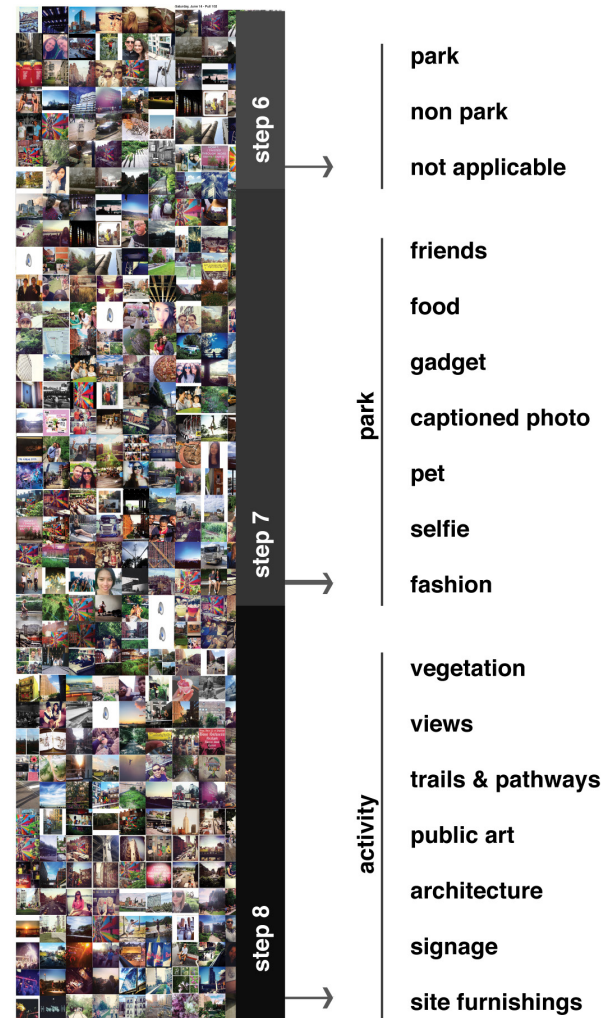
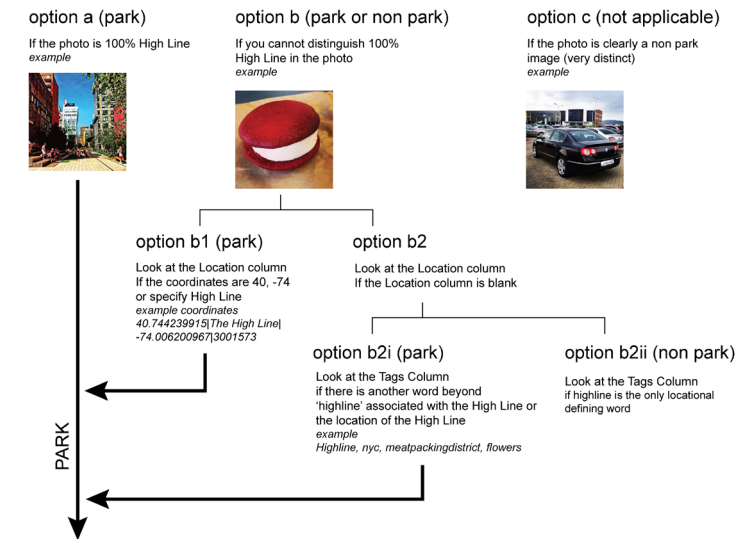


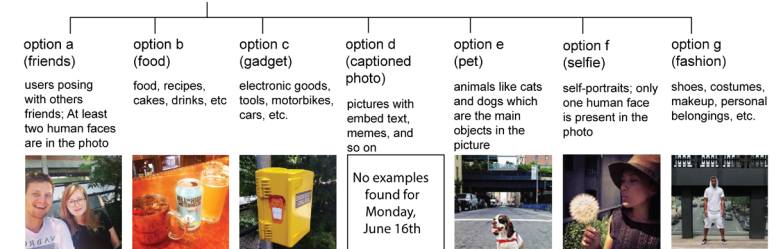
Figure 3.11 Analysis stage

Flow Chart - Categorizing Instagram Photos

Step 1- determining between park, non park and not applicable



Step 2 - Park further categorized into "What we Instagram"



Step 2a - Park further categorized into "What we Instagram"

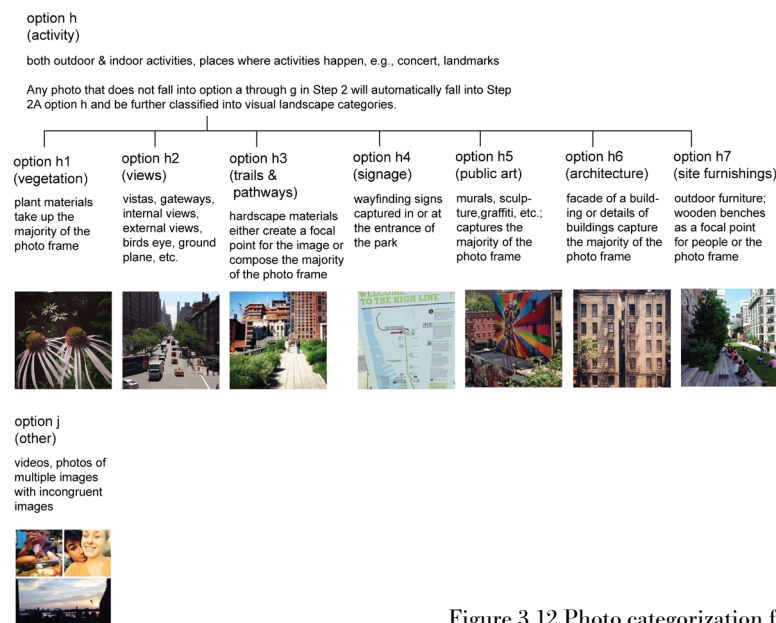


Figure 3.12 Photo categorization flow chart

and associated with the park, such as *NYC* or *meatpackingdistrict*, then the photo would receive a Park categorization. If *highline* was the only determining word, the photo would be classified as Non Park (NP) as it was too difficult to determine if the photo fell on the physical park or in the surrounding vicinity.

The third categorization, Not Applicable (NA), was used for photos that had no reference to the park or any surrounding park locale. The example in Figure 3.12 illustrates a photo of a car.

After determining the classification of each photo as Park, Non Park or Not Applicable, the Park photos were further analyzed in Step B of Figure 3.13. Photos were then sorted according to categories presented by Hu, Manikoda and Kambhampati in their work, *What We Instagram: A First Analysis of Instagram Photo Content and User Types*. Photos were classified and coded as Friends (F), Food (FO), Gadget (G), Captioned Photo (CP), Pet (P), Selfie (S), Fashion (FA). If the photo did not fall into one of these categories, it was coded with Hu, Manikoda and Kambhampati’s final classification, Activity (A). All Activity photos were considered relevant to the field of landscape architecture and required further analysis.

Step Aa took all the photos classified in step 1 as Park and in step A as Activity and further assessed and coded each one as Vegetation (V), Views (VI), Trails and Pathways (T), Signage (SI), Public Art (PA), Architecture (A), Site Furnishings (SF).

The final categorization of Other (O) was used for all photos that were either videos, collages of photos with differing classifications (four photos combined with one photo falling into the Views (VI) categorization and the other three Architecture (A)) or the photo was an outlier to the classification process.

Figure 3.13 shows the same sample inventory page as illustrated in Figure 3.7 but with the last attribute columns labeled 1, 2, 3, and 4 also coded.

The final step of the data collection consisted of processing the photos through manual visual analysis. Each of the 103 queries, consisting of 20 photos per query, and all the attributes were bound into their representative book based on the date of the query (see Figure 3.14).

Each of the 2,060 photos were printed in sheets with a label on the back of each photo referencing the book it was associated with. The sheets were then cut into a thumbnail-sized photo and bagged in codebook numerical order according to the order they were pulled in (1-20 per each of the 103 sheets) in a labeled manila coin envelope (see Figure 3.15). Each photo was hand labeled according the categorization in each book and placed in one of 17 associated plastic bins. See Figure 3.16.





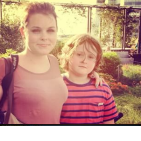
tags	type	location	filter	created_time	link	id	Photos	1	2	3	4
highlife,slacklife,highline,slackline	image		Lo-fi	1402926314	http://instagram.com/p/pTp00kjc6Z/	744122313213857462_965865882		NA			
beautiful,highline,love,garden,family,june,sunny,raised,walkway,cityscape,lush,newyorkcity,sunday,afternoon,gorgeous,fun,nyc	image		Mayfair	1402926225	http://instagram.com/p/pTpp_GQARq/	744121568602358890_23999096		P	A	V	
empirestatebuilding,highline,niceview	image		Unknown	1402926017	http://instagram.com/p/pTpQKRIN6-/	744119821806919358_1099252102		P	A	VI	
highline	image	40.744239348 The High Line -74.00620099 3001573	Rise	1402925983	http://instagram.com/p/pTpMddyLvI/	744119539625147337_1874653		P	A	VI	
beautiful,highline,love,newyorkcity,family,june,raised,fun,sunday,afternoon,walkway,cityscape,nyc,garden	image		Toaster	1402925960	http://instagram.com/p/pTpIouQAQ3/	744119345554129975_23999096		P	F		

Figure 3.13 Sample page of the coded dataset



Figure 3.14 Codebook collection

After all the photos were appropriately labeled and placed in each associated bin, the *Park Activity* category was further coded into sub-categories based upon visible patterns and whether or not the captured and shared photos fell within or from a designed element of the park. Designed elements were distinguished using the maps of each section of the park as described from the book, *Designing the High Line: Gansevoort Street to 30th Street*, (Friends of the High Line 2009). The design elements map of the park was created for the purposes of this study and can be seen in Figure 3.17.



Figure 3.15 Processing the photos

CATEGORIES

- non park (NP)
- not applicable (NA)
- park friends (P, F)
- park food (P, FO)
- park gadget (P, G)
- park captioned photo (P, CP)
- park pet (P, P)
- park selfie (P, S)
- park fashion (P, FA)
- park activity vegetation (P, A, V)
- park activity views (P, A, VI)
- park activity trails & pathways (P, A, T)
- park activity signage (P, A SI)
- park activity public art (P, A, PA)
- park activity architecture (P, A, A)
- park activity site furnishings (P, A, SF)
- park other (P, O)



Figure 3.16 Hand labeling the coded photos and placing each in the representative bin

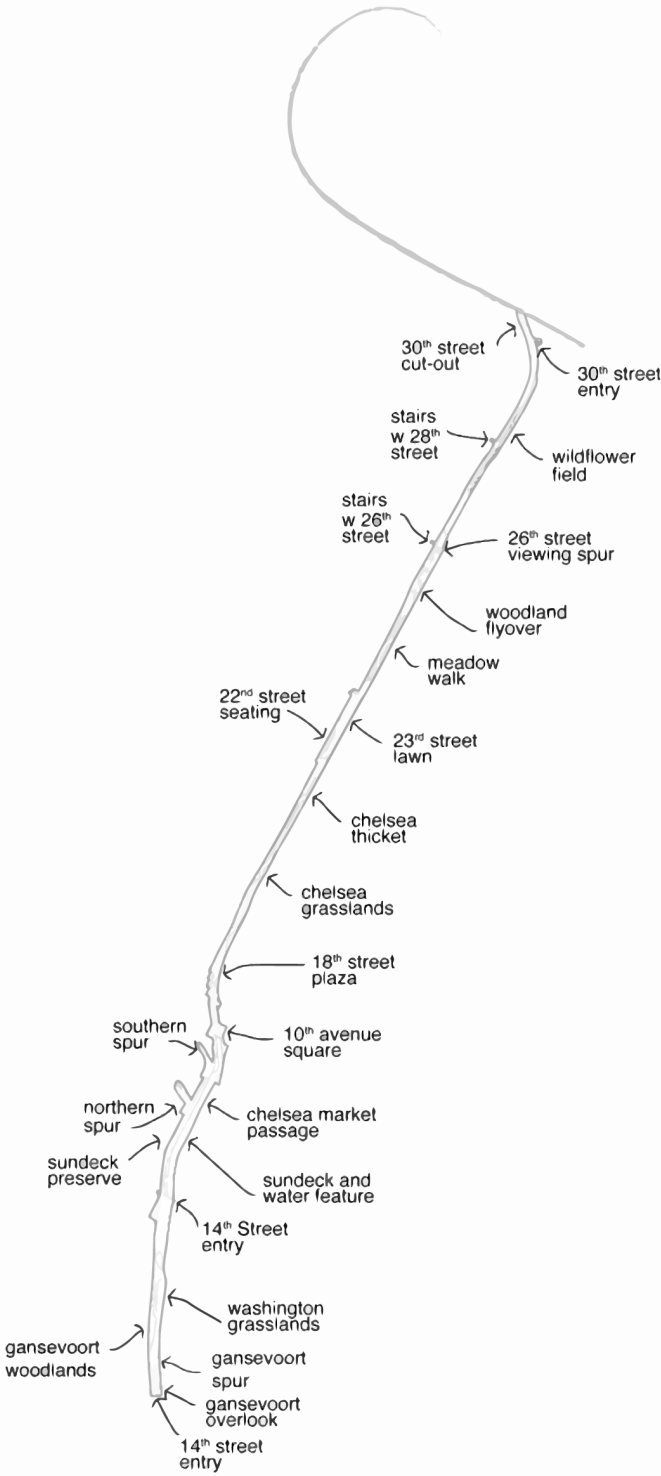


Figure 3.17 Reconstructed map of the High Line

Both captured and shared photos where the subject comprised the majority of the view frame and photos where the physical location could not be qualitatively pieced together using Google Earth were labeled as non-discernable Instagram photos. The majority of these photos fell in the *Vegetation*, *Signage* and *Views* categories. The remaining captured and shared photos, with the exception of two images falling in the *Public Art* category determined as NA due to an anomaly, were delineated as Instagram photos of / from non-designed elements. These photos captured the pre-existing yet integrated and ever-evolving fabric of the site.

Application

dCODE was created to gain understanding about whether or not Instagram could be used to gather user perceptions about the built environment. While the methodology illustrated a mixing of computed and manual processes could in fact be implemented, the heart of the tool was its ability to mine and synthesize the visual data, as well as the connections between categories as displayed in the Mind Map in Figure 3.18.

The final test of dCODE was to determine if it could be applied in a professional setting. In order to test the viability of the tool, it was employed as it might be used in practice to determine the opportunities and constraints of its application. While mining visualization data was accomplished, applying the tool in a real world setting was necessary to address the sub-questions.

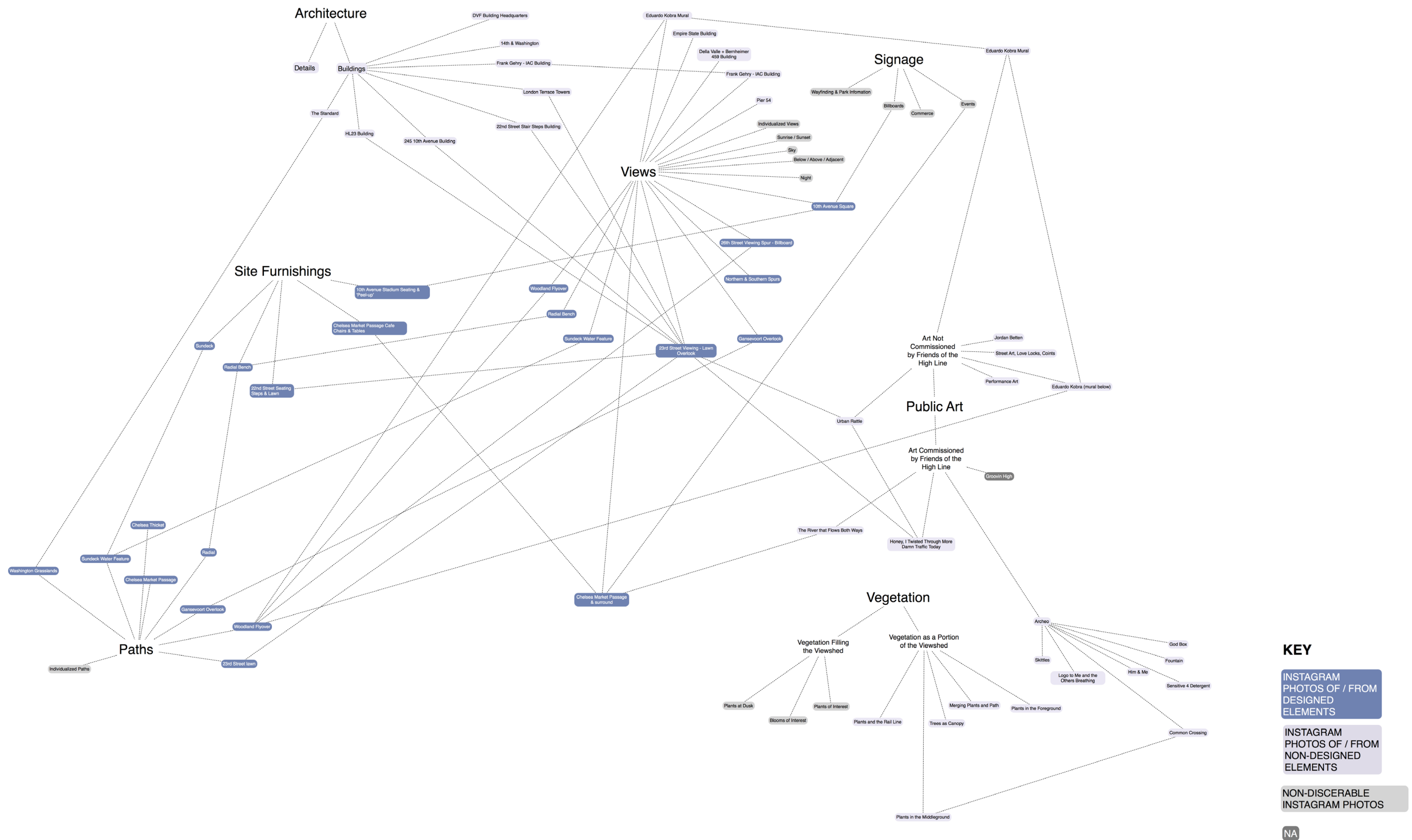


Figure 3.18 Mind Map of the relationships between the seven Activity categories using Scrapple App

ENDNOTES

1 Smolan, Rick, and Jennifer Er Witt. *The Human Face of Big Data*. Sausalito, California: Against All Odd Production, 2012.

2 Weather Underground. Weather History for KNYC - June, 2014. June 14, 2014. https://www.wunderground.com/history/airport/KNYC/2014/6/14/DailyHistory.html?req_city=New+York&req_state=NY&req_statename=New+York&reqdb.zip=10001&reqdb.magic=1&reqdb.wmo=99999 (accessed 2015).

CHAPTER 4: FINDINGS

Introduction

The findings of this study are broken down into three sections: the query (data collection and analysis), the hypothetical professional report and reflections on the tool, dCODE. The first section addresses the findings of applying the tool, dCODE, to the weeklong query of the tag, *highline* during the summer of 2014. The second section synthesizes the knowledge gained through application of dCODE to complete a hypothetical professional report. The third section of the findings offers reflections the use of dCODE.

SECTION ONE:
The Query

The application of the tool to the weeklong query of the tag, *highline* during the summer of 2014 revealed a series of findings that compose the foundational outcome of this thesis. In this section, the query is analyzed numerically and textually. The categories used in the query reveal their significance as well as non-significance to conducting a hashtag query intended to aid designers of the built environment. The categories were derived from Hu, Manikonda, and Kambhampati in their publication, *What We Instagram: A First Analysis of Photo Content and User Types*.

The preliminary findings of the weeklong collection of Instagram data were categorized into four primary categories of images shared by Instagram users: Not Applicable, Non Park, Park and Activity. The preliminary findings detail the percentages and examples of captured and shared photos coded out in the primary categories: Not Applicable, Non Park and Park. These three primary categories are not addressed further after the preliminary findings, as they do not offer additional insight into the landscape elements of or surrounding the park.

Photographs categorized as Activity do address the landscape. Each Activity image captured and shared during the study was classified according to commonalities of the images. The classification result of the primary Activity category is illustrated in Figure 4.1.

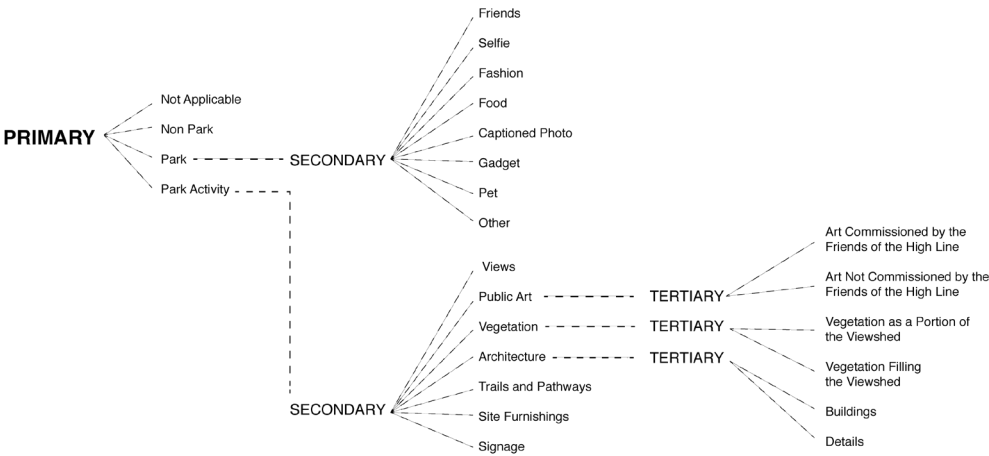


Figure 4.1 Primary findings categorization using Mind Map software

The percentage of images assigned to each category and the content of each category is as follows:

PRIMARY CATEGORY: NOT APPLICABLE = 15 percent

Captured and shared photos tagged *highline*, but containing elements other than the High Line park located in New York were identified as *Not Applicable* and accounted for 15 percent of the pull. This category was mainly composed of non-landscape photos. The Volkswagen Jetta Highline as well as Scania trucks, both holding the *highline* name were present. Other photos using the tag *highline* in this group were captured and shared images of a physical highline or tightrope. While these photos held obvious proof they did not fall on or near the High Line, other captured and shared images in this group were not easy to assign. For example, there were three photos in the pull from the High Line Park in Paris. The examples of captured and shared photos falling in the *Not Applicable* category can be seen in Figure 4.2. The *Not Applicable* category was not examined further in this study.



Figure 4.2 Image examples of the Not Applicable category

PRIMARY CATEGORY: NON PARK = 7 percent

Photos falling into the *Non Park* category were tagged *highline*, but fell in the surrounding neighborhood. Captured and shared photos from the June 2014 pull revealed images of the Chelsea Market, Dream Downtown Hotel, the Highline Ballroom, and the Highline Hotel as illustrated in Figure 4.3. The *Non Park* category was not further addressed in this study.

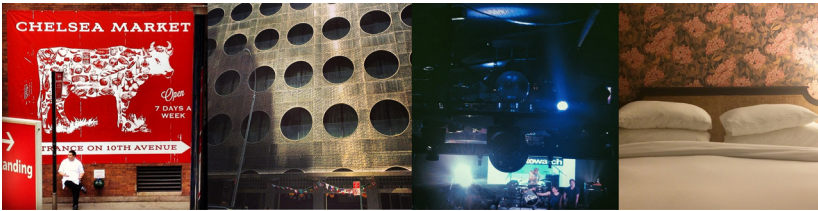


Figure 4.3 Image examples of the Non Park category

PRIMARY CATEGORY: PARK = 26 percent

The primary *Park* category was further coded into secondary categories. Eight of the secondary categories, *Friends*, *Selfie*, *Fashion*, *Food*, *Captioned Photo*, *Gadget*, and *Pet* derived from the field of computer science through the research paper, *What We Instagram: A First Analysis of Instagram Photo Content and User Type*.¹ The eight secondary categories helped to sift out pictures falling on or near the High Line but not as a whole, representational of the landscape. Examples accounting for 20 percent of the total pull are illustrated in Figure 4.4. *Friends*, *Selfie*, *Fashion*, *Food*, *Captioned Photo*, *Gadget*, and *Pet* secondary categories were not further classified in the study.

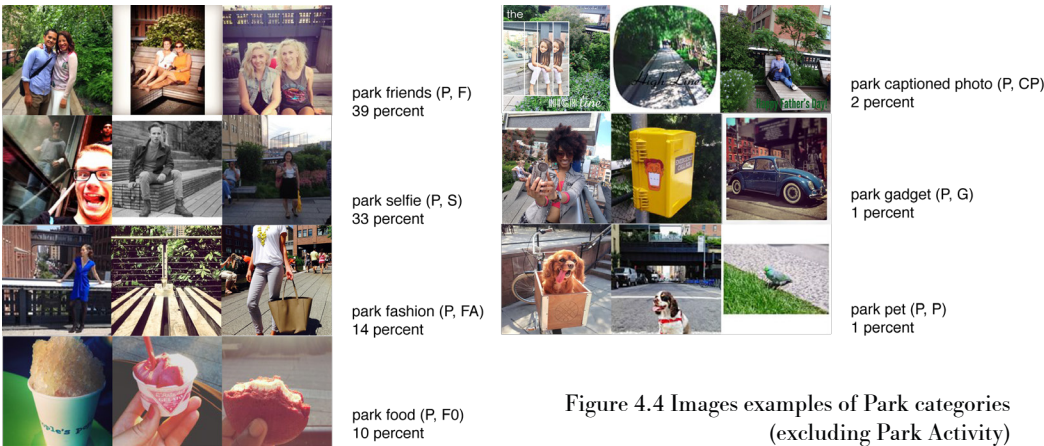


Figure 4.4 Images examples of Park categories (excluding Park Activity)

The last secondary category in this section of the preliminary findings is the *Other* category, which accounted for the remaining 6 percent of park images. The majority of photos that fell into *Other* were pictures of multiples and videos captured from the pull as illustrated in Figure 4.5. Images and videos falling in the *Other* secondary category were not further addressed in the study.

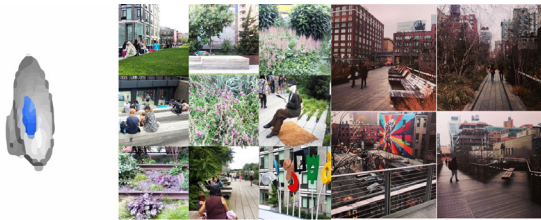


Figure 4.4 Image examples of the Other category

PRIMARY CATEGORY: PARK ACTIVITY = 52 percent

Park Activity, accounted for 52 percent of the June 2014 Instagram pull and was also first introduced in, *What We Instagram: A First Analysis of Instagram Photo Content and User Type*.² The difference between *Park Activity* and the primary category *Park* was found in the images each captured and shared photo represented. *Park Activity* indicated a detectable element or elements in the picture plane relevant to the field of landscape architecture.

Further broken down, the *Park Activity* primary category was further coded into seven distinct landscape secondary categories. The secondary categories came from further manual coding of each of the *Activity* categories. Here is where the commonalities begin to illustrated hidden patterns. Each of the seven secondary categories was defined through human coding of the photos and is further addressed below. The percentages in the seven secondary categories reveal the portion that fell into the 52 percent of the primary category, *Park Activity*.

Secondary Park Activity Category: Views = 48 percent

With 510 photos falling into the *Park Activity Views* category, the findings of the study revealed the public’s common interest in taking pictures of the park and surrounding region. Whether the vantage point was on, below, adjacent, or above the High Line, the *Park Activity Views* accounted for approximately 48 percent of the *Activity* photos and almost doubled the numbers found in any other category.

Secondary Park Activity Category: Public Art = 16 percent

According to the Friends of the High Line, the art presented on and around the elevated park includes, “site site-specific commissions, exhibitions, performances, video programs, and a series of billboard interventions.”³ Each piece “invites artists to think of creative ways to engage with the uniqueness of the architecture, history, and design of the High Line and to foster a productive dialogue with the surrounding neighborhood and urban landscape.”⁴

Photos from the June 2014 pull exhibiting art were categorized as *Park Activity Public Art* when either the majority of the picture plane revealed art, or the public art piece was the most prominent element in the view shed. To help further address the landscape elements in *Public Art*, the secondary category was further coded into two tertiary categories: *Art Commissioned by the Friends of the High Line*, and *Art Not Commissioned by the Friends of the High Line*.

Secondary Park Activity Category: Vegetation = 12 percent

Vegetation accounted for roughly 12 percent of the *Park Activity* category. It was further coded into the tertiary subcategories, *Vegetation Filling the Viewshed* and *Vegetation as a Portion of the Viewshed*.

Secondary Park Activity Category: Architecture = 10 percent

In order to be classified as *Park Activity Architecture*, each of the photos from the June 2014 pull needed to either fill the majority of the picture plane with an image of a building or of architectural details. Two tertiary categories, *Buildings* and *Details* include 51 photos coded as *Building* and 61 photos coded as *Detail* images.

Secondary Park Activity Category: Trails and Pathways = 7 percent

In order to be classified as *Trails and Pathways*, the captured and shared photos had a trail as the primary focal point. And in most instances, the photos displayed a one-point perspective. The images included people as a central focal point walking on a trail. However, in order to be coded as *Trails and Pathways*, the people either needed to have their backs to the camera or not be facially recognizable. Any photos where the features of the people in the photos were distinguishable were previously coded out in the one of the Secondary *Park* categories, *Friends* or *Selfie*.

Secondary Park Activity Category: Site Furnishings = 4 percent

The *Site Furnishing* category accounted for 4 percent of all the *Park Activity* pulls. While images of seating did not account for a significant amount of captured and shared photos, images where seating was visible did not fall into the *Site Furnishings* category as most of these images illustrated the site furnishings in use and were previously coded out in the one of the Secondary *Park* categories, *Friends* or *Selfie*.

Secondary Park Activity Category: Signage = 2 percent

At 2 percent, *Signage* accounted for the lowest amount of photos in a secondary category. In order to be coded into this category, each captured and shared photo needed the sign to be the main focal point.

**SECTION TWO:
Hypothetical Professional Report**

The hypothetical professional report was created to gain understanding about whether or not Instagram could be used to gather user perceptions about the built environment. The hypothetical professional report was designed to emulate how a professional firm would employ the tool and methods addressed in this thesis. The report, conducted on the High Line, moves beyond mining visualization data through the query of the hashtag *#highline* and offers opportunities as well as constraints.

The process of developing a tool to gather user perceptions about the built environment from Instagram posts resulted in a specific tool or application, dCODE. This app is currently working through the trademark application process, representing the intellectual property developed by completing this study. One outcome of this thesis is an exploration of the potential commercial application of dCODE. Potential application of the tool to professional landscape architecture practice was tested through production of a hypothetical professional report for the designer of the High Line, the landscape architecture firm Field Operations.

Information extracted from the June 2014 Instagram query was summarized to determine if the findings might be relevant to landscape architecture practice. Upon completion of the hypothetical professional report, three main findings were revealed: the process requires subjective decisions about the relevance and significance of each image; the process required conjecture of what was not photographed as well as what was; and the images are passive and do not capture the active life of the park.

Subjective decisions of the images placed the collective analysis of the query in the control of the researcher. Therefore, every element of the analysis, from placing the images in selected categories to defining opportunities and constraints, relied upon the philosophy of the researcher. While levels of interpretation may shift from the researcher conducting the query to the thought leader in the industry receiving the query, dCODE used in the hypothetical professional report is meant to be a malleable process.

The second finding, the process required conjecture of what was not photographed as well as what was, is linked to the subjective deliberation involved in the first finding while conducting the hypothetical professional report. However, choosing to look at the full spectrum of the designed space, whether or not a photograph was evident proved to be one of the more powerful results of the report. While not all-inclusive, the report addresses the findings of testing dCODE on the High Line, as well as offering opportunities and constraints of the built space. The report identifies areas of positive impact as displayed through the eyes of the public in the series of captured and shared images. At times, opportunities displayed as a high number of photographs collected in a certain area, but at others, it was the lack of images found in quiet moments that were the most powerful. For example, when the images are collectively located, using intensity mapping, pockets of non-visual information appear. Through closer observation, the pockets reveal passive areas of the park, such as art installations hidden amongst the Woodland Flyover where minimal seating is available. On the opposite end of the spectrum, the report addressed constraints or areas where either design, public education or curation could be enhanced as displayed through the eyes of the public. Just as with the opportunities, the images captured, shared and displayed revealing constraints at times were the largest collections of images.

The final finding, queried images are passive, was realized during reflecting on the findings of the report. Images are mere moments in time. The hypothetical professional report was conducted during a one-week sampling in June of 2014. In the end, the report offered a glimpse of the space as seen through captured and

shared moments of pedestrians. Each of these findings helped to determine the true nature of the report, a visual sounding board capable ping-ponging ideas, thoughts and additional subjective analysis by thought leaders in the industry to apply the findings where it is deemed most fitting for future applications.

Working on the hypothetical professional report uncovered the opportunities and constraints associated with using dCODE to assist landscape architects. Implementing and completing a professional report helped answer the questions: “What would we learn by applying this tool to a real site, and what is the viability of using the tool to inform landscape architecture?” Prior to applying the tool the site, the query findings told a simple story: in this particular instance, the one-week study during the summer of 2014 conducted using the hashtag, *highline* revealed, more people were capturing and sharing images of the landscape than of any other image category collected. In completing the hypothetical professional report, it became clear that the results could not be driven solely by numbers. The hypothetical professional report reflects the ebb and flow of activities of use, the rhythm of a park’s life that makes it successful. The urban environment thrives on active as well as the passive engagements addressed in the study. It is the combination of the two that has led to the success of the High Line. The combination of not understanding the significance, or non-significance of the quantity of images played an important role into the complexities of delivering a report of this caliber. In the end, the dichotic and simultaneous ebb and flow of the park illustrated through the collection of captured and shared images required knowledge of the park that is beyond the researcher’s professional experience and familiarity with the park.

Is the hypothetical professional report a significant contribution to a practitioner looking to glean insight on a particular space or the future of the built environment? The answer is twofold. Yes, it is relevant, but the intensive time spent on this type of activity and report could result in initial intrigue, but ultimately determined in the operational context as not a value add.

SECTION THREE: **Reflections on the Tool**

Working within the parameters of tool development required observational cognitive analysis. The codebook was not constructed as a play-by-play example. Instead, each step followed certain protocols during the query process, but relied heavily on the knowledge base of the researcher as opposed to the quantitative findings produced through computation methods during the application of the tool.

How can Instagram be used to gather user perceptions about the built environment? The answer appeared to be simple; it was by developing a tool. Developing a tool to synthesize posts on Instagram that allows landscape architecture practitioners the opportunity to learn about the built environment was time consuming but relatively straight forward.

The greatest challenges were the complexities and unraveling technologies that were presented as mental hurdles throughout the process. These hurdles and the potential for dCODE to be utilized by a landscape architect are addressed in the following section.

THE COMPLEX HURDLES

Capture

One of the main questions that arose during creation of dCODE was: can this tool be learned by practitioners? The answer is yes, but the learning curve is high. Capturing, the first stage of dCODE development, created a series of obstacles. In order to capture information from the back end of Instagram, a basic understanding of software development was needed in order to set up the account and perform an API call. Some of the more daunting tasks were understanding how to transcribe the JSON language to CSV; how to capture the images; how to work with Epoch and Unix timestamps; how to query beyond the initial 20 images and continue to fluidly work backwards in time; how to decipher what associated meta-data was important to the project; and, how to methodically perform the set tasks of querying the vast amounts of information over and over again through a prescribed series of steps.

This portion of the research required approximately 300 hours of immersion in the process over eight months. Not only did each of these questions need to be answered; but, they needed to be understood in order to execute dCODE as second nature. It is estimated that replication of the capture phase for a project similar in scope would require 150 hours.

Output

The output phase came with its own set of questions. How should the images captured be categorized in a database? What should the process be? What does a codebook look like and function for this type of application? A methodical approach was created following a flow chart of “if, then” statements. But without physically touching the images, it became quite clear that the first attempt of categorization was a failure. The visualization of the images on the screen was too much information to

process. But, 2,060 images scattered on the floor would not work either. The answer was to print each image at the thumbnail size of 150 by 150 pixels with the associated codebook locational information on the backside. In the chance an image was misplaced, it could easily be relocated with the original metadata in the codebook.

This portion of the research required approximately 200 hours of immersion in the process over eight months. It is estimated, that replication of the diligence phase for a project similar in scope would require 100 hours.

Diligence

Performing the diligence phase of the process requires travel to the study site. In this study, that was a trip from Omaha, NE to New York City. Visiting the High Line for the informal visit created the hurdle of cost versus profit. In hindsight, the trip was well worth the expense as it answered a series of questions that cropped up during the output. One example was an art exhibit of a refrigerator filled with bottles that appeared, in the Instagram images, to be edible. But, there was not enough evidence to place the images directly into Public Art. Instead, they were categorized as Food until their appropriate category was revealed during the visit.

This portion of the research required approximately 20 hours of immersion at differing times of the day over a period of 5 days at the site. It is estimated, that replication of the diligence phase for a project similar in scope would require a similar number of hours constructed in a similar fashion of immersion.

Examination

While all of these obstacles were challenging, the largest question was, “what was being coded?” The obvious answer is: Activity categories. But then what? The examination portion of developing dCODE was perhaps the second most difficult aspect of the study. Beyond becoming familiar with the technological facets, walking into the unknown to find hidden patterns and commonalities created a difficult challenge to overcome. While the complexities of the examination phase were difficult to master, once a method was established, the repetitive task proved to be more efficient in terms of time management than originally anticipated.

This portion of the research required approximately 250 hours of immersion in the process over eight months. It is estimated, that replication of the examination phase for a project similar in scope would require 150 hours.

CHANGING TECHNOLOGIES

Just as the technology that made this study possible grew quickly once introduced to the public, the technological aspects of Instagram have changed fairly rapidly. On November 17, 2015, Instagram announced a new platform policy.

Apps created on or after November 17, 2015 will start in Sandbox Mode and function on newly updated API rate-limits and behaviors. Prior to going Live, and being able to be used by people other than the developers of the app, these apps will have to go through a new review process.⁵

The changes were enforced primarily due to a breach in privacy by a third-party feed reader, which jeopardized active user accounts and the ability to organically create tools, such as dCODE. This new policy means that continued use of dCODE will require review and approval of the app by Instagram.

dCODE is grandfathered into the Instagram API Console and has until June 1, 2016 to be submitted to Instagram for review.⁶ Any individual or company looking to create an app with the API Console moving forward would need to vet out their ideas with a limited number of users, who supplied the app with permissions. The change in technology speaks to the instability of dCODE moving forward. Without permission, the tool applied to the changes established today will revert back to sandbox mode, a trial mode that was not in existence during the summer of 2014 High Line query.

ENDNOTES

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6 Instagram. *Instagram for Developers*. 1 2016. <http://developers.instagram.com/post/133424514006/instagram-platform-update> (accessed 3 15, 2016).

An aerial photograph of a city street, viewed from above. The street is lined with buildings and trees. A brown overlay covers the entire image, and the text "CHAPTER 5: DISCUSSION" is written in white, serif, all-caps font in the upper left quadrant.

CHAPTER 5: DISCUSSION

Introduction

The question, “How can Instagram be used to gather user perceptions about the built environment?” was formulated while ruminating over the changes in the processes of capturing, to capturing and sharing personal encounters on the High Line. The transitional movement from the camera to the entwined visual technologies of the smart phone and social media appeared, on surface level, to have a positive impact on the ability to gather user perceptions. Both, the landscape observer as well as the iconic status or popularity of the park, were subjectively exploding with the introduction of Instagram. What began as a singular thought soon spiraled into a series of possibilities as more questions were brought to light than those that were answered. While this research has proven quantitatively that Instagram can be used to gather user perceptions about the built environment, both the tool to query the developer side of Instagram and the significance to the practice of landscape architecture is seeped in a series of fleeting moments. Photographs do not reflect the active life of the park. Once one question was answered, another was brought to the surface. The following discussion addresses the changes that have occurred throughout the time spent researching Instagram and developing the tool to query the images captured and shared on and around the High Line. This journey ends with the idea that tools, such as dCODE, can be impactful visual sounding boards to learn about the built environment, as long as the technological limitations and synthesized perceptions do not dominate and skew the collective consensus of the findings.

Time and Bias

Design practitioners interested in learning from the built environment or past designs are limited today to outmoded methodologies. For example, post occupancy evaluations, the systematic evaluation of opinion about spaces already in use, are often examined in academia with the intent to learn from design decisions. But a slow adoption rate occurs in the field due to high application costs and time constraints. Beyond the money and time hindrances, bias can also skew the results of studies utilizing methodologies immersed in photographic evaluations of the landscape. In the background chapter of this report, three primary ways to understand user perceptions were discussed: viewer preferences, visitor employed photography, and time-lapse photography. Each of these methodologies are framed by pros and cons concerning time and bias. Of these methodologies, VEP, the tool used to gather information from the general public, is the existing method closest to implementing the developer end of Instagram.

It offers and reduces time spent gathering visual information. But introduces bias not seen in the other two existing methods of capturing user preferences.

THE CREATION OF dCODE

In order to understand how Instagram could be applied to the design profession, the ever-evolving research proved to need a means, or a methodological tool, to uncover the end results. The question surfaced while learning about the developer end of Instagram and the complexities involved in querying information in a coded format: Can a tool be developed that can synthesize posts on Instagram in a way that allows landscape architecture practitioners to learn about the built environment? dCODE was designed in response to the need for a tool to query, output, and examine the vast amounts of visual data stored in the Instagram API Console. And the attempt to learn from the past methodologies and balance the complexities of the time intensive study was ambitiously undertaken.

While the tool was, and still is, riddled with complexity and time constraints, what was learned from the creation of dCODE as a one-time academic exercise validates the potential for this type of work. The opportunities provided by large sets of visual data in Instagram from landscape architects to learn more about user perceptions of the built environment with better execution capabilities.

Developing the Tool: Opportunities and Constraints

dCODE has the potential to be an analytics solution for landscape architects who design or manage public space. The tool captures photographs uploaded to social media and leverages geographical information system capabilities and proprietary analytical protocols to turn the results into actionable data for intelligence graphics, interactive mappings and outputs for “lessons learned” activities to inform future design.

dCODE is both analog and digital. The tool queries digital captured and shared images through the back end of Instagram, but the tool was incapable at the time the study of gathering the images alongside the metadata seamlessly into a database. The images were not harvested in one massive computerized effort. Instead, human adaption to integrate the images with the coded language of the attributes queried from Instagram was necessary. Once in compiled format, human interaction with the data set was once again called upon.

Manual coding was used to discern and categorize the images. While the time required for this type of coding and dataset development appeared to be a complete constraint to the dCODE tool development, in reality it proved to be a combination of constraints as well as opportunities for learning.

Manual coding was essential in part because today's technologies still cannot replicate human judgment, and in part because the technology was not intended for this type of research. Developing dCODE as an analog and digital tool created opportunities to mold dCODE as it evolved. If the entire process was digital, it would have been more difficult to identify pitfalls in the process as the images would have been collected through the computer. While hindsight is 20/20 when opportunities fail, the opposite does not hold true. When constraints prevail, it is hard to say what would have happened had an alternate path been chosen. If the computer had captured all the images, this research, more likely than not, would have not dug as deep. Instead, a qualitative tool, such as NVivo would have been employed to house and analyze the images and all manual processes would have logically stopped.

The Importance of the Tool in Application

Applying the tool to a real site, such as the High Line, revealed the general public's desire to capture and share images of the environment over all other images collected; validating the usefulness of the tool. If the tool proved more people were taking images of themselves or their friends, food, or even applying captioned images over the top to express personal ideas, the discussion of whether or not to prompt other research to pave this rough path would be moot. While at first glance, the numbers point to the need for landscape architecture professionals to explore new avenues of understanding perception and the built environment, the historical evidence offers further validation. Technologies change but people's connections to the built environment have not. By exploring a rich history of capturing to capturing and sharing the landscape beginning in the 1600s, this research recognizes that Instagram may or may not be a fleeting fad. It is the role and responsibility of the researcher studying the perception of the built space to remain connected with the changing technologies of the day in an attempt to deliver insight for practitioners to make the most impactful designs for pedestrians in the space.

In addition, utilizing technological advances of today's world allows practitioners to be at the forefront of real-time data from an uninhibited venue. Through social media, people are experiencing space in a new way. And one of the best ways to ensure viable designs is to look at the people using the space.

The following information breaks down the opportunities and constraints of the study of applying the tool and concludes with the thoughts of venturing down an alternative path where the visual social media query is conducted on a set location.

Limitations of the Tool

Use of dCODE is contingent upon how people are using Instagram. Through tool development, it became apparent that understanding how people were using Instagram was an important detail not to be overlooked.

While phones, such as the iPhone are equipped with built in longitude and latitude in the metadata of each image collected, this information is only revealed if the phone operator has the Location Services in the Privacy Settings turned to 'on'. Therefore, collecting geo-locational information is like a layer cake in the phone, and these options appear to be in a constant state of flux. First, people have to employ the Location Services. Second, these locations can be overwritten if people chose to use the Photo Maps, which were introduced as a new Instagram user function in 2012 and were taken away during the end of 2015. The interactive mapping feature allowed users to optionally locate and potentially bypass the Location Services. For instance, if a photo of the High Line was taken, but not Instagrammed until later in the day, week or year, the Photo Map located the image based on the Location Services of the device. But at the time of the study, the operator could create Custom Locations and bypass the Location Services.¹ Instagram changed this logic in 2015 with the release of Searchable Locations.² The developer end of Photo Maps was a constraint for using Instagram as a research tool during the time this research was conducted.

In the hypothetical professional report of the High Line one of the queried attributes was location data. Not all photographs were assigned a geo tag, but the ones that were could not necessarily be used to identify where the physical location of the photo was taken. For example, the photo in Figure 5.1 was taken on April 24, 2015 at 1:32:15 PM by the researcher, Kimberly Kneifl.

Approximately 4 months later in the state of Nebraska, the photo in Figure 5.1 was Instagrammed with three differing options to determine exactly how location works. First, the photo was viewed in the iPhone 5 on the Koredoko App to reveal the photograph's geographical metadata. The latitude and longitude results can be seen in Figure 5.2.

The latitude and longitude were converted to decimal format for comparison to the location attribution field in the Instagram API Console. The results revealed a smart phone with the location services turned on will only be located if the photograph being Instagrammed was added to the Photo Map or when

the photograph was added to the Photo Map and the location was named. However, when a person choses to name the location, they may actually be physically off the mark. In Figure 5.3, the public art piece ‘Honey, I Twisted Through More Damn Traffic Today’ and labeled Actual Location, was taken by myself, the researcher and points to the blue dot near the center of the High Line. The other blue dot, located off of the High Line is referencing the geo-coordinates connected to naming the location High Line when Instagramming the photo.



Figure 5.1 Image taken by the researcher on the High Line in the spring of 2015

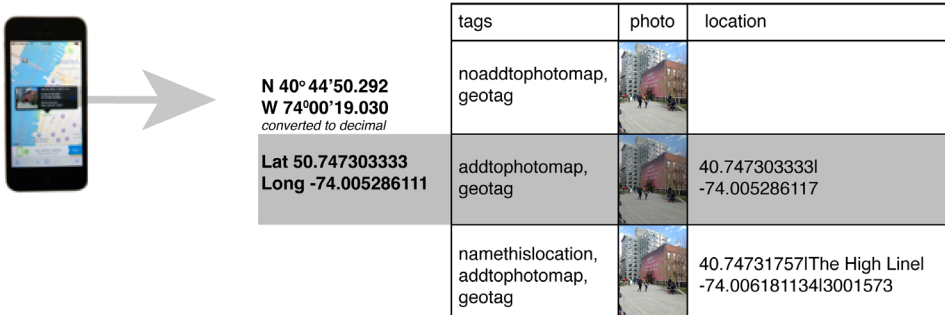


Figure 5.2 Locational outcome identified during this study

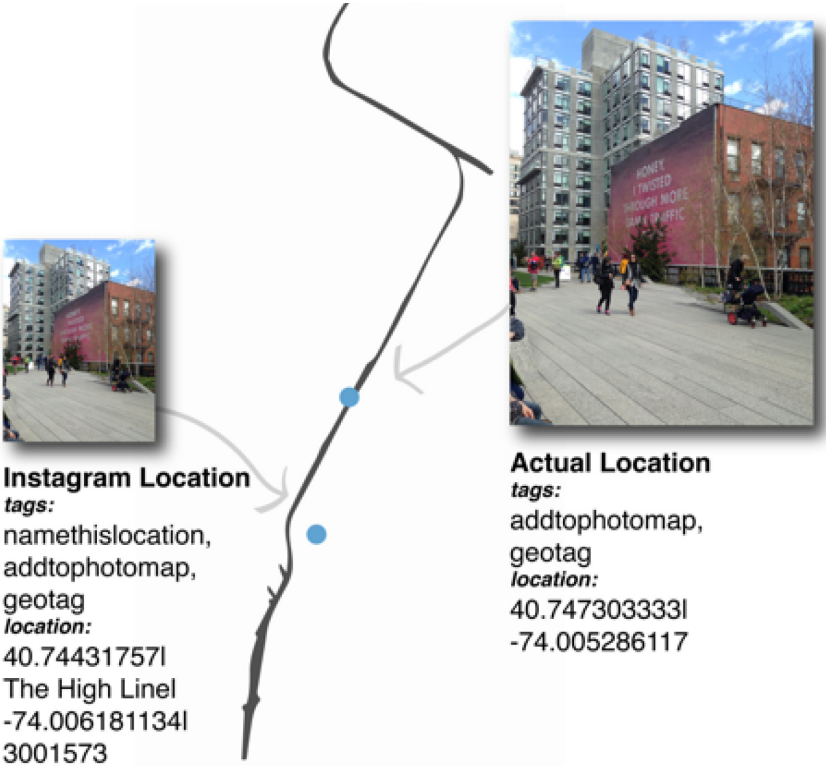


Figure 5.3 The two locations

Changing Technologies in Instagram

Locational information became more and more apparent as other methods of querying Instagram were taken into consideration. The Instagram API Console was developed to offer a number of alternative ways to approach visual information. Tags was just one of the Endpoints options. Users, Relationships, Media, Comments, Likes, Locations and Geographies were also available options. Beyond Tags, a Locations/Search where a researcher could search for a location by geographical coordinate was an appealing alternative. The public content at the time of the study had the capabilities to work with Foursquare, Facebook Places or integrate a center point latitude and longitude. While the default distance range is 1000 m to 5000 m, this type of query could have allowed dCODE to access information based on the location. An opportunity that would saved time by avoiding additional hours querying unwanted data and human coding the anomalies into Non Park and Not Applicable categories.

At the time of the study, the constraints to Locations as a query were still contingent on the use of the tool. In order to identity how location would work on a larger scale basis, all the photographs with location data from the tag pull were geo located using CartoDB. The results are revealed in a series of maps. The Cluster map in Figure 5.4 reveals 247 photos all in one location. It would appear people are using the Name This Location and Add To The Photo Map options and selecting High Line as opposed to letting their phone location services reference where they have actually snapped a photo.

The output of the data in the map was also a little deceiving during the time of the study. While 247 photos appeared to share the exact same geo coordinates, the map was meant to be interactive and the clusters began to cumulate with scalability. In addition, the mapping software only scaled in so far and some of the data points were not retrievable.

While there were constraints to using Instagram and mapping the data points, utilizing the advances in technology proved to be an opportunity. dCODE harnessed Instagram data and used locational intelligence allowing researchers to implement interactive as well as static maps. The series of maps in Figure 5.4 is using 55 percent of the photos geo-tagged and located around and on the High Line from the original tag pull. The results, while preliminary at best, allowed designers to see and interact with the research as the general public unknowingly intended.

Working with Instagram over roughly a two-year period has proven to be a challenge in that nothing appears to be stable. From the user to the developer side, Instagram is in a constant state of flux. Today, as of March 2016, the Instagram app

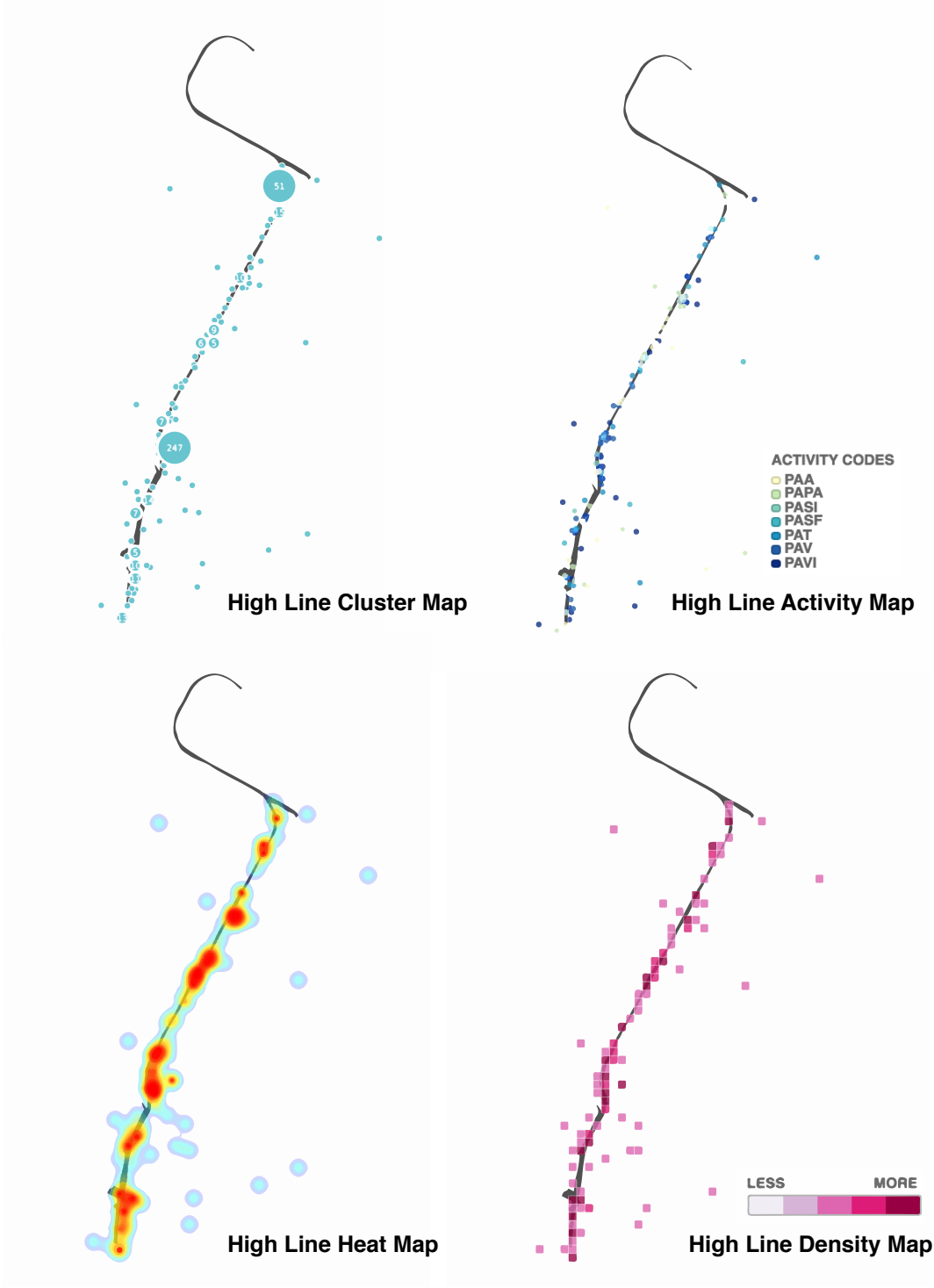


Figure 5.4 Mapping the tagged results with the locational attributes of 55 percent of the query

on the phone only employs the ability to Add Location. And while this function still causes difficulty for locating the true point of the captured and shared image, other platforms are increasing their scope to accommodate these obstacles. As of January 2016, CartoDB announced the ability to stack chips, or the ability to visualize many points that share the same locational information.³

Technology is constantly advancing. And the platforms used in this research, and to vet out future research, are making impactful changes as well. At times these changes work toward the goals of the research at hand and at times, they are in direct opposition. Working within the parameters of Instagram is twofold. It is a positive way to capture and share user preferences with minimal cost constraints, as it is to this day, a free service. But working within the realm of the Instagram platform can cause major hurdles, costing more time.

Conclusion

The future of dCODE and the application to the field of landscape architecture could prove to be an effective tool capable of saving time and money by producing unbiased results as illustrated through this research. But Instagram is an ever-changing platform creating shifts in the operational processes of querying visual social media. Beyond technology, it is also important to consider the human-centric aspects. People's perceptions of the built environment become more and more critical as our luxury of technology has the potential to reduce the ability for people to give preference a thought.

Concluding with the thought that "Big Data could know us better than we know ourselves"⁴ is romantic. But such gestures are pure play. This study was informed by preference studies. But the uninhibited angle creates additional challenges. We do not know enough about what taking a picture means. Is it as simple as expressing preference? Is it because the viewer thinks something is weird or out of place? Or is it that the flower is the color they want their next sweater to be?

The flipside to this research is that, like any neurological exploration, we may never know. One argument, addressed from the architectural perspective, pointed out that bright murals could be pre-programmed viewpoints, created by designers implementing points of photographic quality in the landscape, augmenting the natural tendencies to of pedestrians to capture images of murals, such as the commissioned Eduardo Kobra piece.

In order to understand any romantic notions threaded through the research and moving past playful idealist theories, future studies appear to need to address the cognitive thought processes of individuals taking images of the landscape. Then,

through collective qualitative and quantitative sifting can the research begin to be grounded. But as the simple question, how can Instagram be used to gather user perceptions about the built environment, soon spiraled into a complex journey, weaving technology into our understanding of the landscape. Sifting through the threads, dead ends, and contemplations has revealed the uninhibited data collection is both a weakness and strength capable of offering a visual sounding board of a specific time on a specific built space to be applied to practice as each landscape architect or firm finds the information most fitting.

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ENDNOTES

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APPENDIX



dCODE FOR THE HIGH LINE

A hypothetical professional report prepared to test the procedure followed in *Capturing Preferences: Instagram and the High Line*

What is dCODE?

dCODE is a visual intelligence tool for urban design. Imagine a world where the community’s captured and shared images of the urban fabric were used to influence and mold future design and programming. dCODE is a tool that queries captured and shared images of the built environment. The collection of pedestrian images is inventoried and analyzed to find commonalities and the results are brought to the hands of the design professional.

How it Works

dCODE queries images and metadata from Instagram based on the needs of the firm and the project. Each captured and shared photograph is manually coded and categorized. The output is a series of visual representations of the space overlaid with the design created by Field Operations. dCODE takes the Site Analytics portion of the report a step further and offers findings to Field Operations. The concept of the technology behind dCODE is illustrated in Figure A.1 and presents opportunities and constraints through a series of heat maps and photomontages for Field Operations to consider.

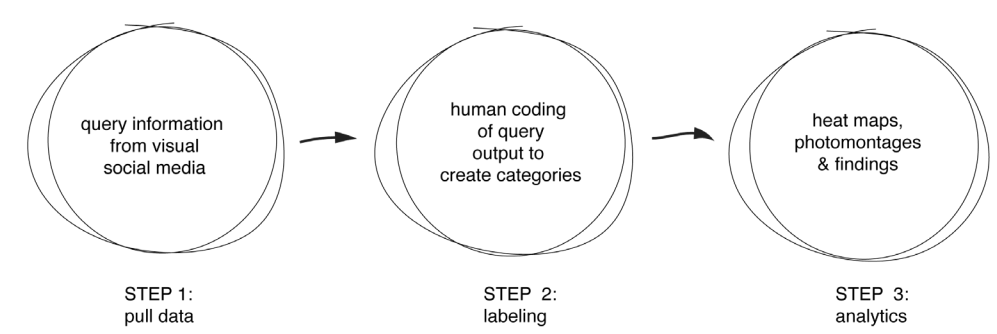


Figure A.1 dCODE process diagram

Why dCODE for the High Line?

The High Line represents an optimal location due to two essential elements: locational success and virtual success.

Locational success of the High Line was evident from the 2012 online blog source, Friends of the High Line. With 4.4 million pedestrians passing through the park over two years after the initial opening; the High Line was measuring a success rate comparable to other iconic urban sites. The difference with the High Line was the almost instantaneous public popularity. Prior to online social exposure, iconic spaces, such as Central Park, commonly were slower to see such high volumes of visitors.

Connecting the locational success to the virtual world is necessary to utilize dCODE. A preliminary query was run to test the viability of the High Line as a beta candidate for the dCODE tool. The preliminary data pull from Instagram revealed the status of captured and shared photos tagged *highline* grew intensely over the first half of 2015. From January to June, a 76 percent increase was revealed in the number of High Line photos posted as illustrated in Figure A.2. The preliminary results of the increase in people using the tag *highline* indicated the park was a prime target site to test dCODE capabilities.

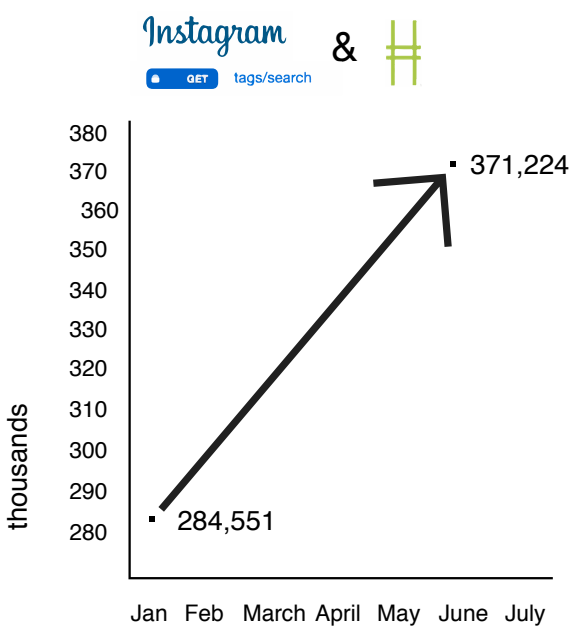


Figure A.2 Statistical illustration of the increased use of the tag *#highline*

The 2015 growth data of the term *highline* used as a hashtag was conducted prior to the 2014 study. While the reverse chronological order can be confusing, the Instagram API Console allows data to be queried from any set point in history. This study was iterative. The testing was conducted in real time at the beginning of 2015, prior to setting the actual date for the study in the previous year.

Methodology

dCODE is a tool for extracting and categorizing images from visual social media platforms. While there are a number of potential avenues to gather photographs from the back-end of the application, such as users, relationships, media, comments, likes, tags, locations and geographies, for this beta exercise, dCODE focused on a tag search of the captured and shared images from the developer side of Instagram using the hash tag, *highline*. The query gathered captured and shared photographs from a 168-hour period from June 14th through June 20th of 2014. The dates were selected to avoid major holidays and poor weather conditions. The data pull resulted in 2,060 photographs with associated attributes.

The query results were imported into a database where the photographs and the attributes of the beta test of the High Line were stored. The database, along with manual coding, was used to further separate each photo into a series of categories as illustrated in Figure A.3. As the analysis was conducted using a tag search, there were a series of photos tagged *highline* that fell outside of the realm of the park. There were also photos using the park as a marketing mechanism. These photos were coded as Non-Park and Not Applicable. In addition, the Instagram developer interface does not discern between photos and videos. The videos from the pull fell into the Other category. Images where multiple photographs were represented in one captured and shared Instagram moment were also categorized as *Other*. The only exception were multiples all containing images categorized together.

To address the captured and shared photographs from the tag pull that fell within the parameters of the High Line but were not relevant to Field Operations, the recent technological research of Yuheng Hu, Lydia Manikonda and Subbarao Kambhampati was implemented. Their work, “What We Instagram: A First Analysis of Instagram Photo Content and User Types,” brought precision to dCODE and quickly helped to eliminate photographs in the following categories: Friends, Selfie, Fashion, Food, Captioned Photo, Gadget and Pet. The results of the captured and shared photographs falling into these categories from the June 2014 pull are illustrated in Figure A.3.

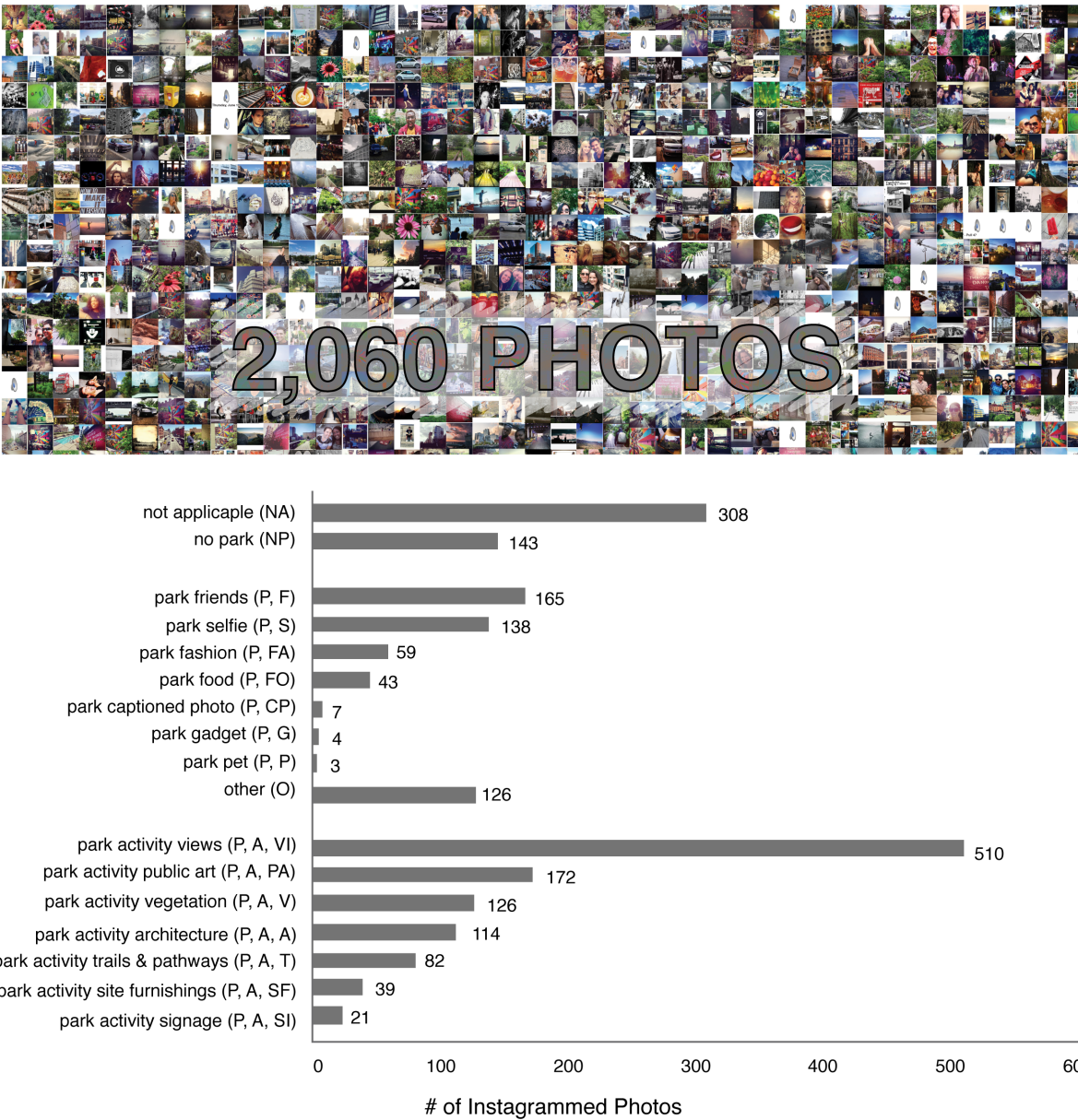


Figure A.3 Coding the Instagram photographs

Yuheng Hu, Lydia Manikonda and Subbarao Kambhampati work also revealed Activity as a major contributing category of Instagram photographs. In the world of computer science, Activity equates to “both outdoor & indoor activities, places where activities happen, e.g., concert, landmarks.”¹ The commonality across industry sectors allowed the study to follow the technological protocols of the academic work in computer science. The Activity results were further coded to reveal seven secondary Activity categorizations: Views, Public Art, Vegetation, Architecture, Trails & Pathways, Site Furnishings and Signage and the results are illustrated in Figure A.3.

Each of the seven secondary Activity categories was further manually coded into a series of further delineated Activity categories. And each of these was qualified as either a Designed Element, Non-Designed Element, Non-Discernible or Not Applicable, based upon the potential the image had to be geo located (Figure A.4).

		Design Elements	Non-Design Elements	Non-Discernible Elements / NA
Views		Woodland Flyover, Radial Bench, Sundeck Water Feature, 23rd Street Viewing - Lawn Overlook, Gansevoort Overlook, Northern and Southern Spurs, 26th Street Viewing Spur - Billboard, 10th Avenue Square	Pier 54, Frank Gehry - IAC Building, Della Valle + Bernheimer 459 Building, Empire State Building, Eduardo Kobra Mural, Chelsea Market Passage	Night, Sky, Sunrise / Sunset, Below / Above / Adjacent, Individualized Views
Public Art	Commissioned		Archeo, Honey, I Twisted Through More Damn Traffic Today, The River That Flows Both Ways	Groovin High
	Not Commissioned		Urban Rattle, Jordan Betten, Street Art, Love Locks, Coins, Performance art, Eduardo Kobra	
Vegetation	Filling the View Shed			Blooms of Interest, Plants of Interest, Plants at Dusk
	As a Portion of the View Shed	Vegetation and Public Art, Northern and Southern Spurs, Vegetation and the Chelsea Thicket	Chelsea Market Passage, Vegetation and the IAC Building	Plants and the Rail Line, Plants in the Middleground
Architecture	Buildings		The Standard, HL23 Building, 245 10th Avenue Building, 22nd Street Stair Steps Building, London Terrace Towers, Frank Gehry IAC Building, 14th and Washington, DVF Building Headquarters	
	Details			Details
Trails and Pathways		Washington Grasslands, Sundeck Water Feature, Chelsea Thicket, Radial, Gansevoort Overlook, Woodland Flyover, 23rd Street Lawn	Chelsea Market Passage	Individualized Paths
Site Furnishings		Sundeck, Radial Bench, 22nd Street Seating Steps and Lawn, Chelsea Market Passage Café Chairs and Tables, 10th Avenue Stadium Seating and 'Peel-up'		
Signage				Wayfinding and Park Information, Billboards, Commerce, Events

Figure A.4 Activity Elements

The constructed details of the park as a Designed Element versus Non-Designed was determined using the maps of each section of the High Line pulled from the book, *Designing the High Line: Gansevoort Street to 30th Street*. The Design Elements map was recreated based upon this collection from pages of the book and is illustrated in Figure A.5. Both the Non-Discernible and the Not Applicable Elements were not mapped as they were unable to be geo ocated.

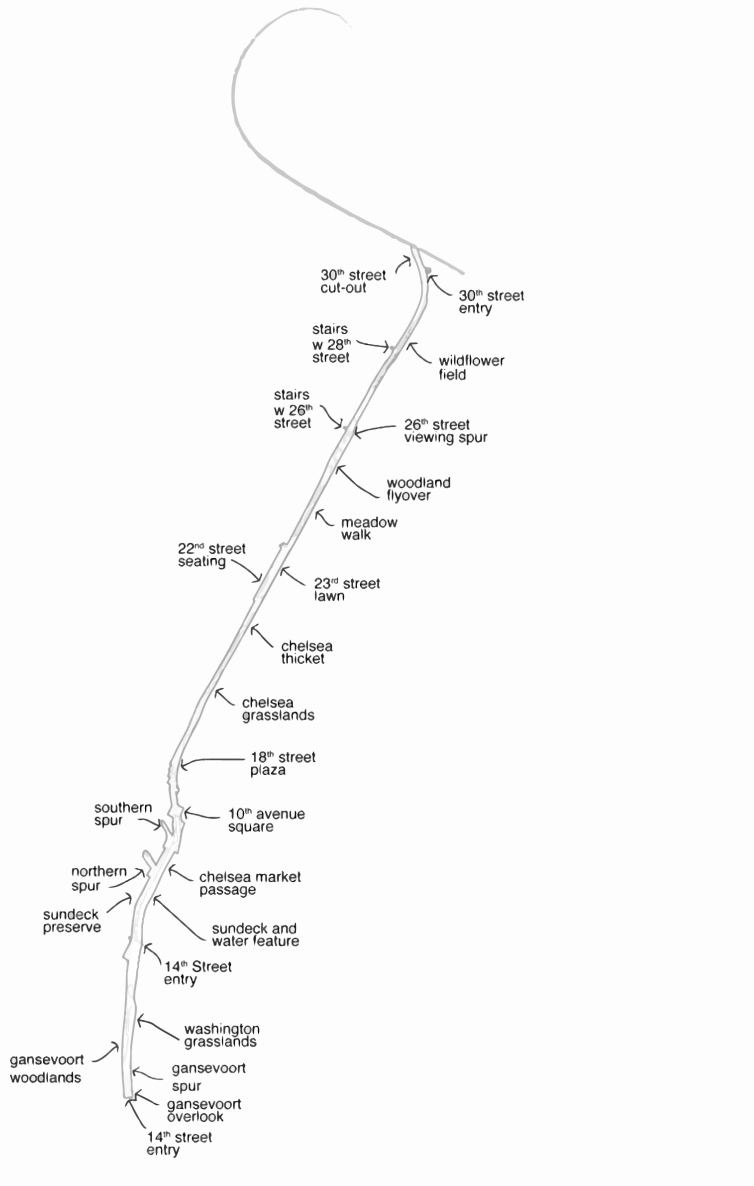


Figure A.5 Recreated High Line map

Site Analytics

The test case of the High Line Park resulted in a series of maps covering the Designed and Non-Designed Elements of the park including: Views, Public Art, Vegetation, Architecture, Trails and Pathways, and Site Furnishings. (Signage is not represented in the Site Analytics section of the report because it does not contain any captured and shared photographs that are either Designed or Non-Designed Elements).

Maps

The Designed Elements and the Non-Designed Elements of the High Line Park were mapped to bring context to the space. The maps are intended to supply Field Operations with a quick overview of the findings of the beta test. Views, Public Art, Vegetation, Architecture, Trails and Pathways, and Site Furnishings maps are illustrated in Figures A.6 through A.17. Intensity of repetitive images, or images collected from the same Designed or Non-Designed Element was used to visually define captured and shared areas of the park in opposition to less prominent captured and shared areas. In addition, each heat map is accompanied by a map illustrating where the distinction between Designed and Non-Designed Elements fell. The series of maps also give examples of the elements and list how many of each secondary Activity category was captured and shared.



Figure A.6 Views heat map



Figure A.7: Views sample photography and activity elements

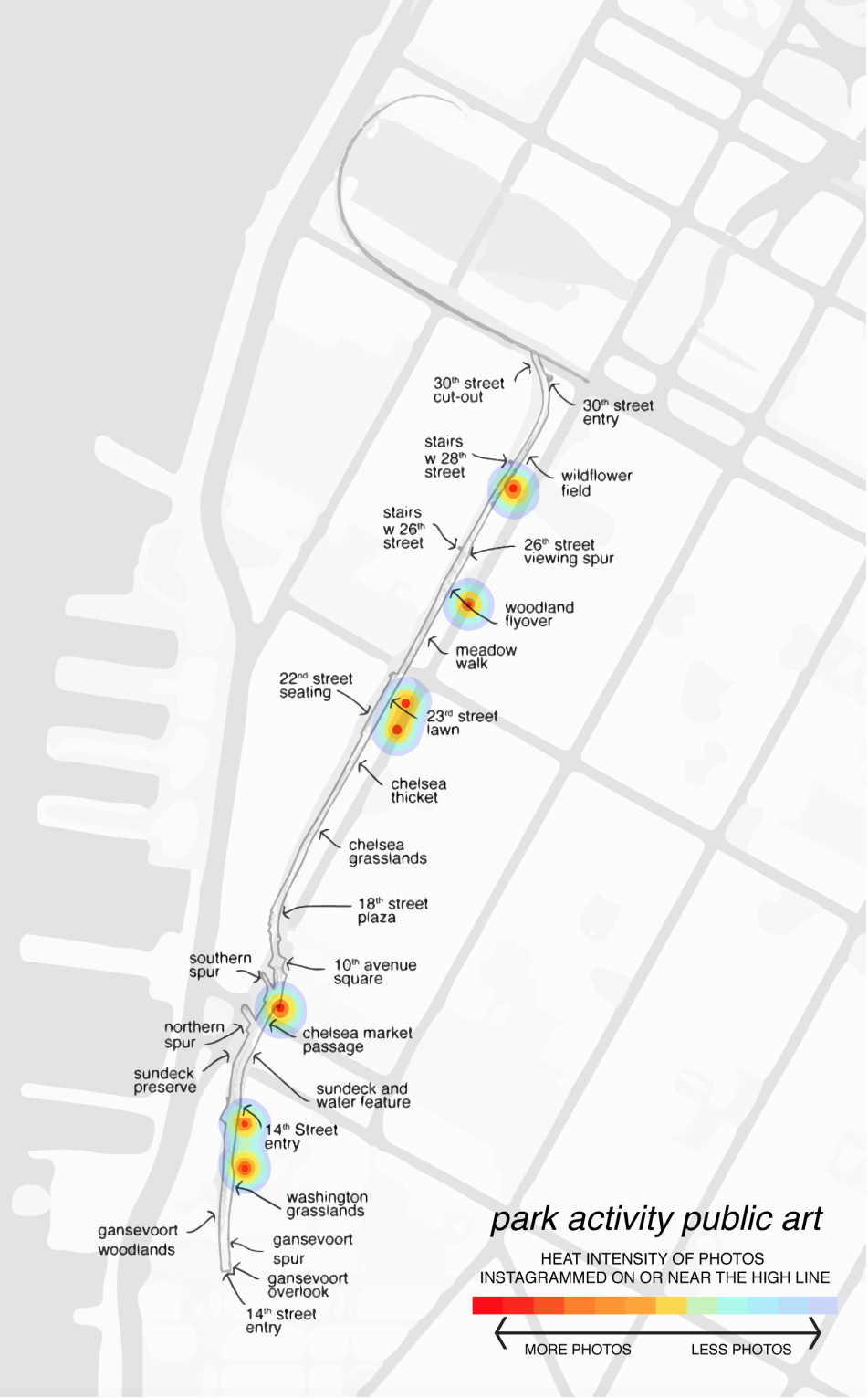


Figure A.8 Public Art heat map

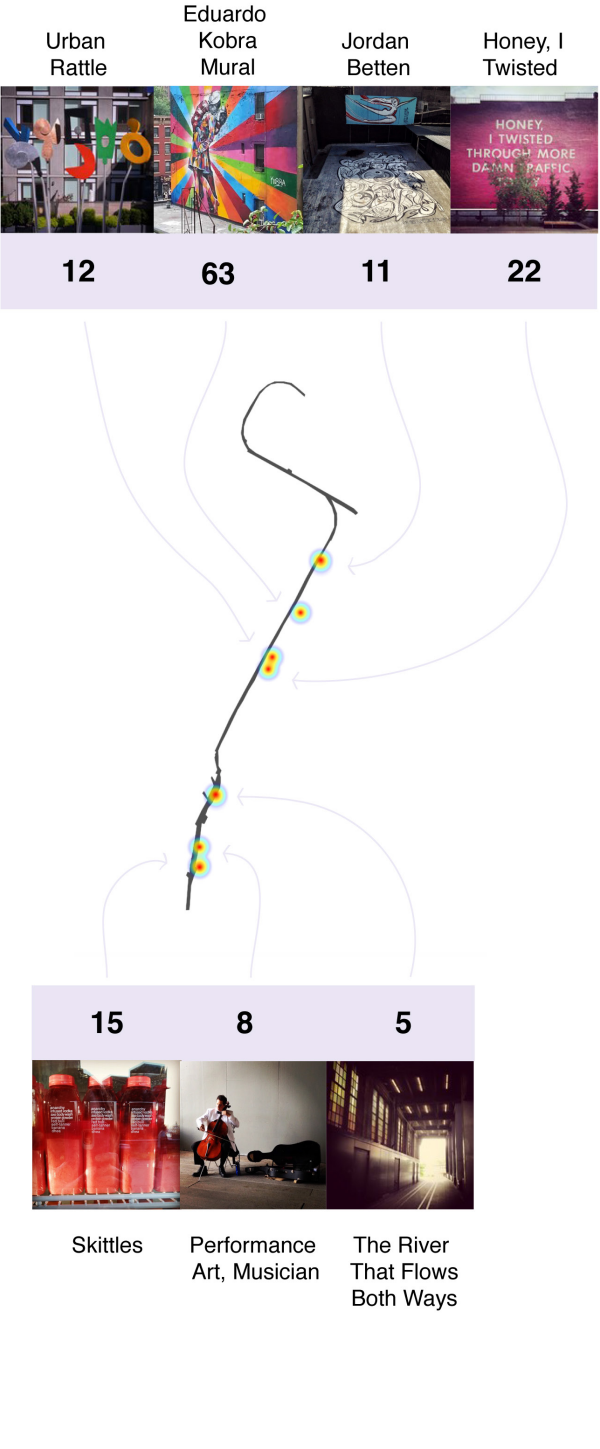


Figure A.9 Public Art sample photographs and activity elements

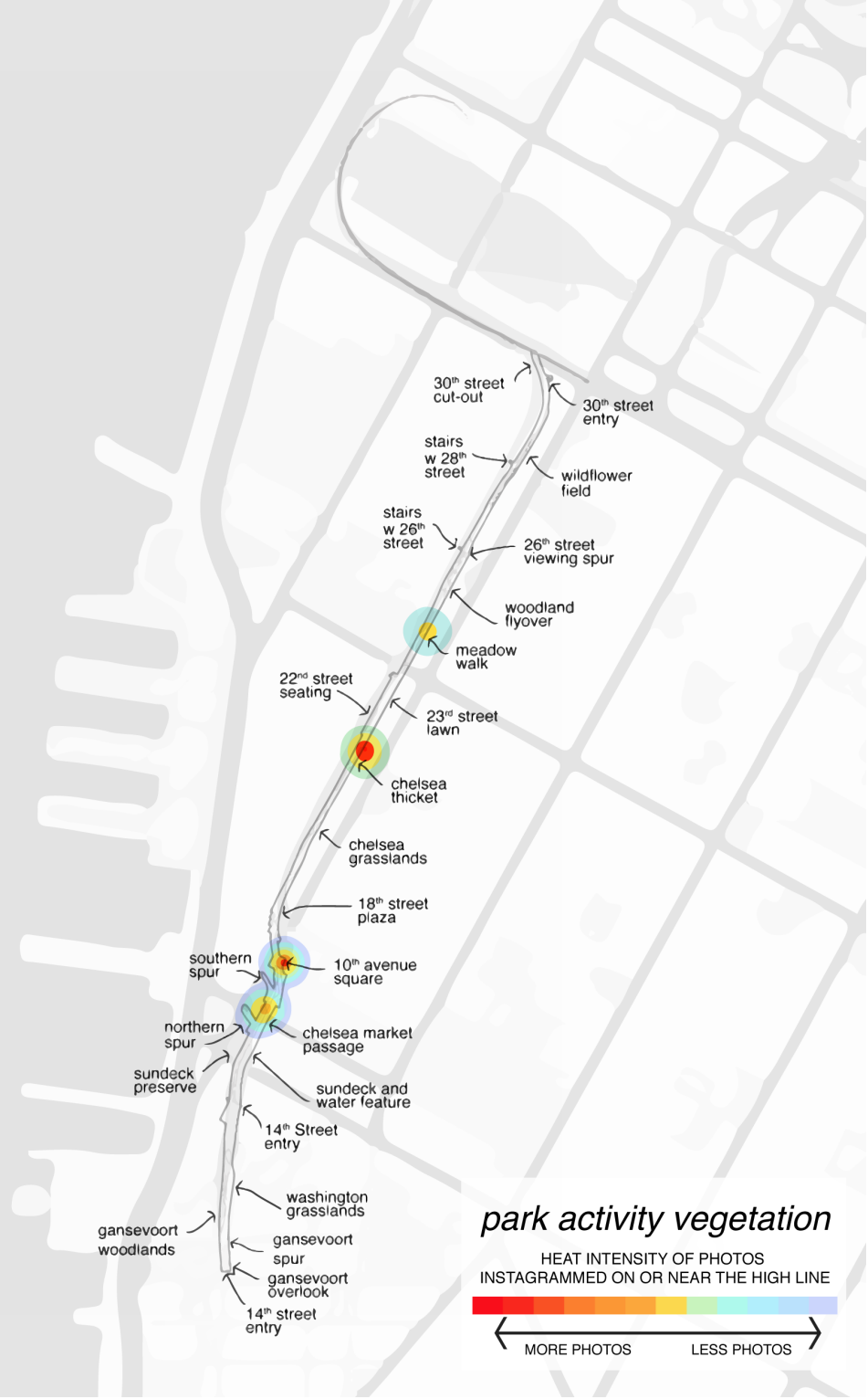


Figure A.10 Vegetation heat map

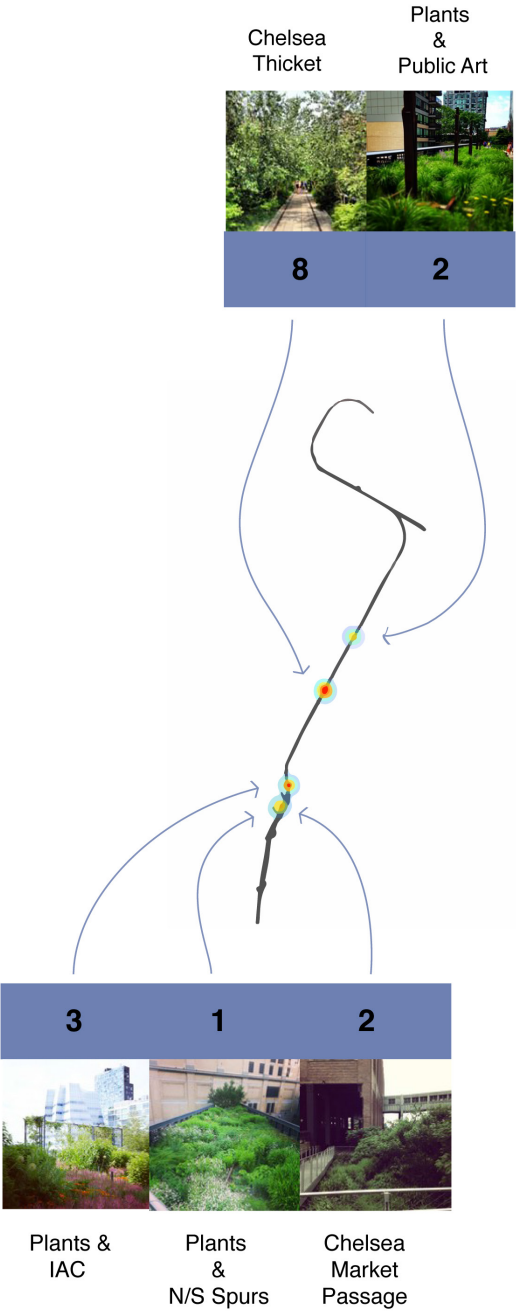


Figure A.11 Vegetation sample photographs and activity elements



Figure A.12 Architecture heat map

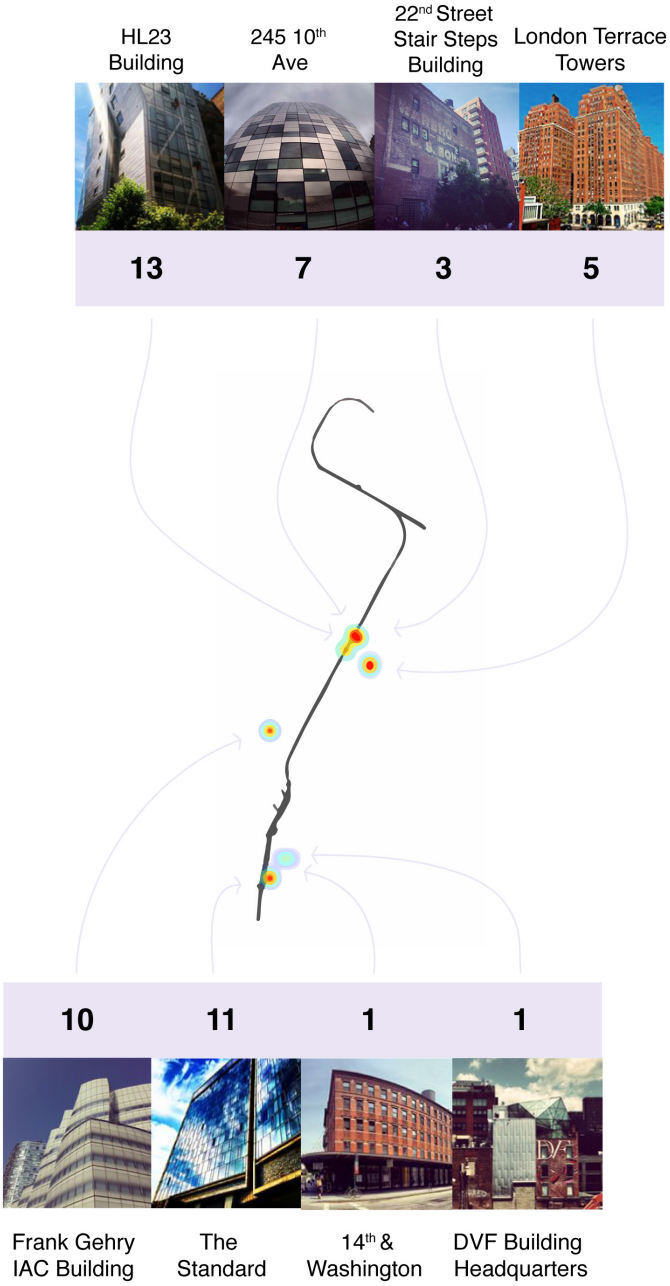


Figure A.13 Architecture sample photographs and design elements



Figure A.14 Trails heat map

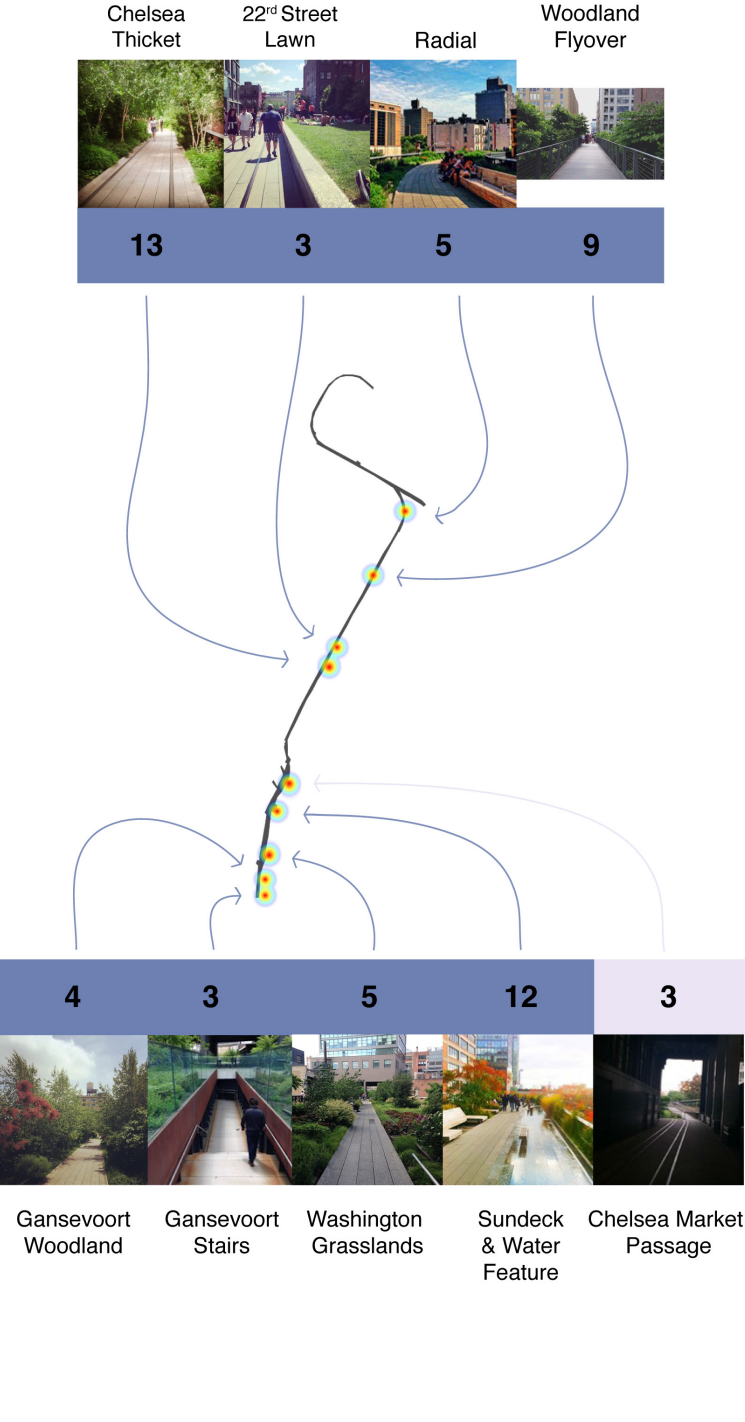


Figure A.15 Trails sample photographs and activity elements

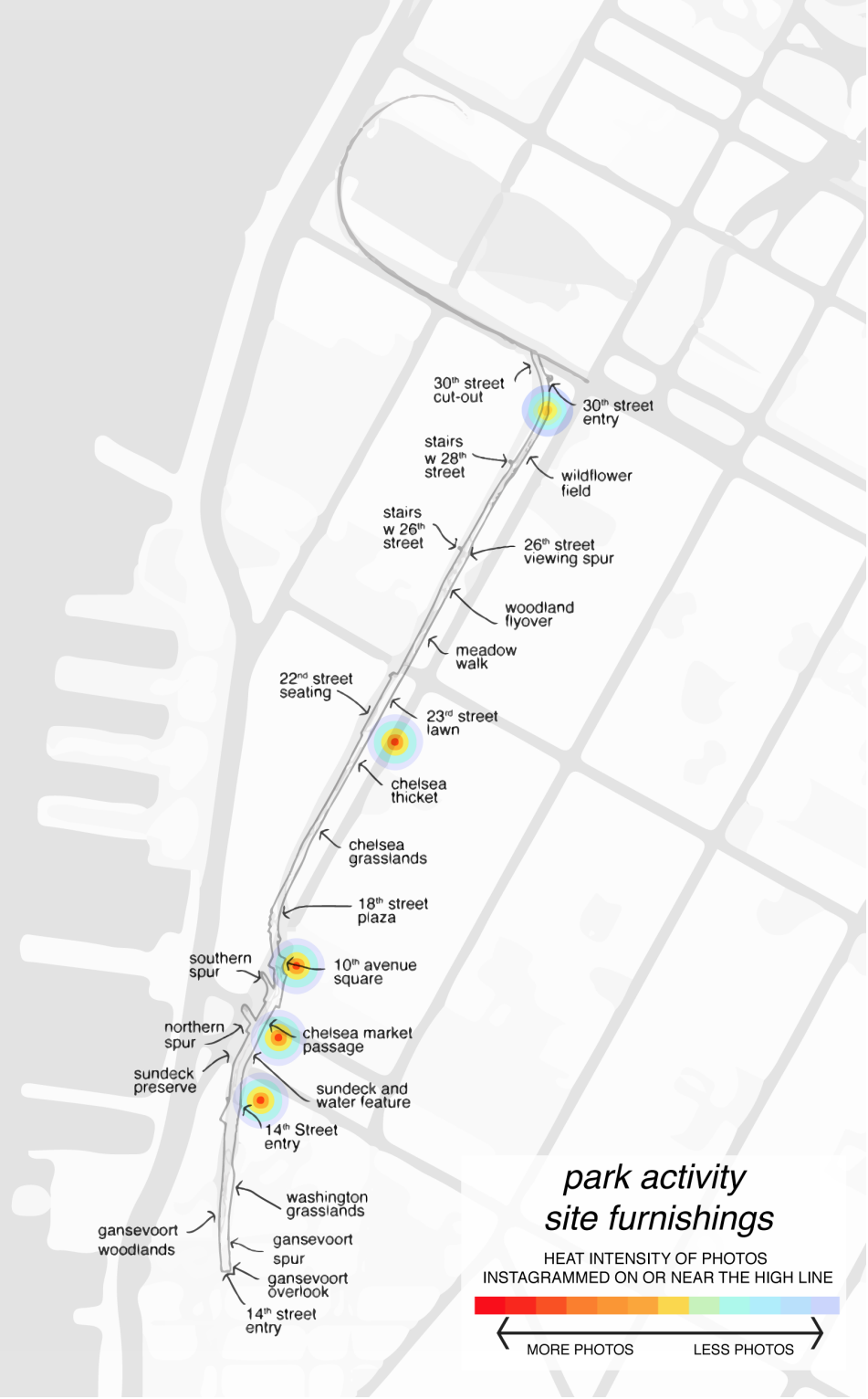


Figure A.16 Site Furnishings heat map

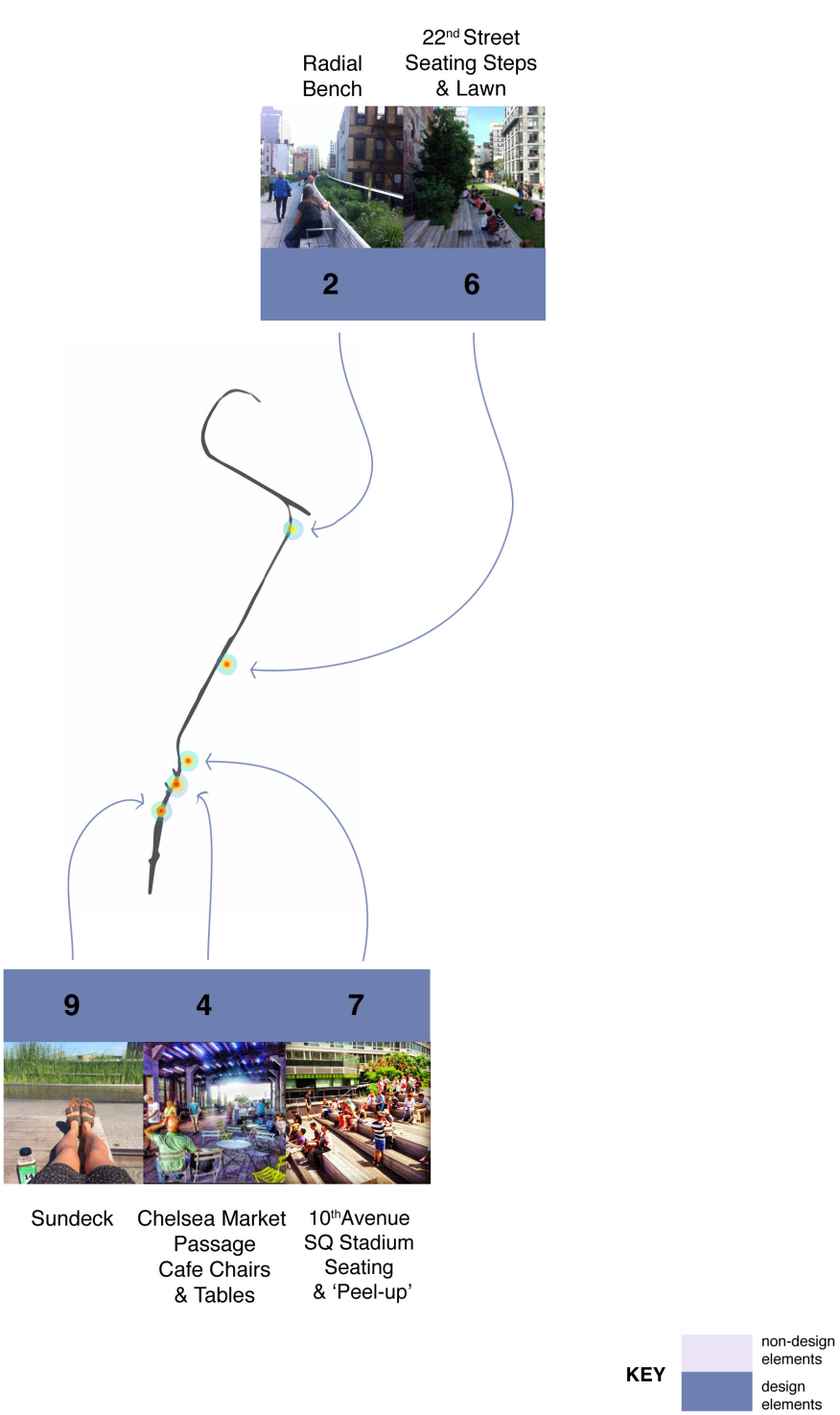


Figure A.17 Site Furnishings sample photographs and design elements

Findings

The following section of hypothetical report discusses the details of the Instagram study as visually revealed through the series of Site Analytics maps as well as the Non-Discernible Elements. These findings are not all inclusive of the entire number of images falling into the Activity category and only attempt to offer deeper insight into how Field Operations may choose to use dCODE to enhance the future of their built works.

The Details

Each captured and shared photo presents a singular opportunity for learning more about the built environment. By arranging the photographs into: primary, secondary, tertiary, sub-secondary and sub-tertiary Activity categories, inferences begin to evolve. At the Site Analytics level the captured and shared photographs have the potential to be roughly mapped. The geo locational placement offers an additional quick look into the rich character of the space. Here, in the Findings section of the report, a deeper dive is taken from high-level findings of the mapped Designed and Non-Designed Elements. In addition, the Non-Discernible Elements, found throughout the study, are also addressed as opportunities to aid in Field Operations future design process. With regard to the Non-Discernible Elements, a portion of the photos falling into this grouping may offer insight to locational placement. However, the distinction in proximity was found to be too vague to pinpoint the whereabouts. You will find this is more prominent with photos of Views, Public Art and Vegetation.

The findings reveal many inferences for Field Operations to examine. One of the main highlights is how captured and shared images are distributed amongst Designed and Non-Designed Elements. Practitioners’ designs are intended to create spaces worthy of public engagement. And while many captured and shared photographs reveal the Design Elements of the park, a significant amount of the images from the June 2014 study also reveal Non-Designed Elements as well as Non-Discernible public perception. Through mapping and further analysis, Field Operations will be more informed of the human perspective of their designed space in the context of the city. Through the use of dCODE, Field Operations has the opportunity to take the information provided and implement it where most appropriate.

VIEWS

510 photos in the Views category, revealed a tendency for the general public to take pictures of the park and surrounding region. Whether the vantage point was on, below, adjacent, or above the High Line, the Park Activity Views accounted for approximately 47 percent of the Activity photos and almost doubled the numbers found in any other category as illustrated in Figure A.3.

A total of 15 vantage points are located at Designed or Non-Designed Elements. Beyond the Site Analytics, the finer interpretive details of the Views also take into account the more prominent Non-Discernible Elements. The breakdown of the View categorization can be seen in Figure A.18.

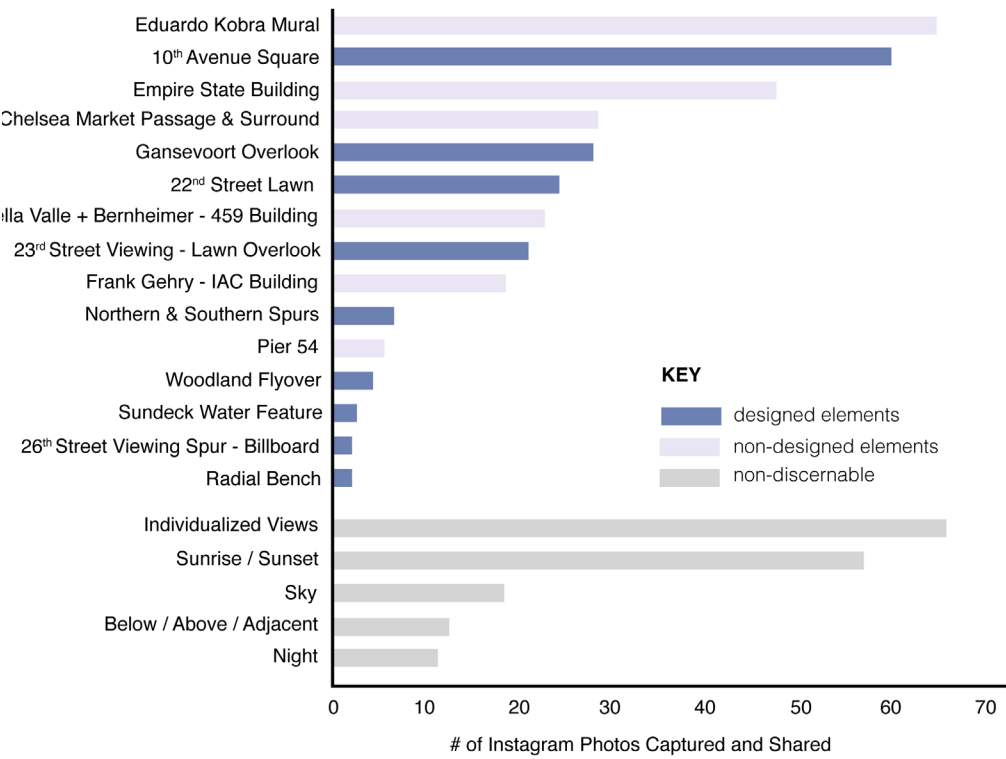


Figure A.18 Numerical and design breakdown of the Views category

DESIGNED ELEMENTS: 10th Avenue Square

The most prominent Designed Element in the Views category was centered around the secondary Views sub-category, 10th Avenue Square.

The details illustrated through the collection of photographs from the week-long study are twofold. People were either taking photographs of the surrounding region while immersed within the design or they were capturing and sharing extended views with the backs of other pedestrians in the foreground (Figure A.19).

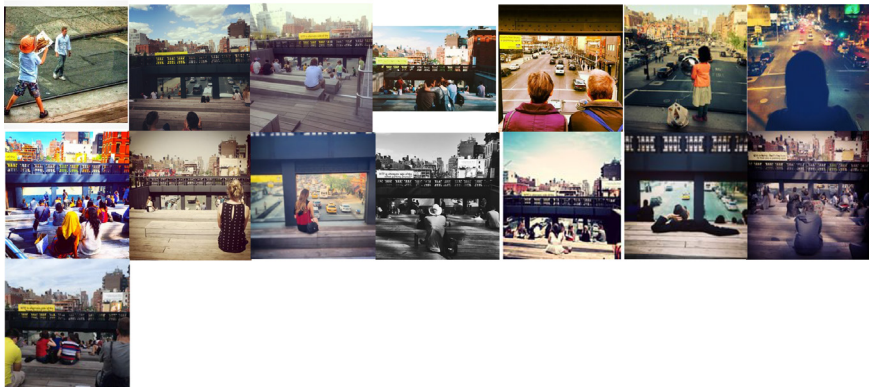


Figure A.19 Hidden patterns at 10th Avenue Square

Pedestrian captured and shared photographs illustrating the park, or extensions of the park to the city beyond, indicate high use of the design. When the captured and shared images begin to encompass the viewpoint of other pedestrians as illustrated in the example photographs of Figure A.19, the findings bridge commonalities between public perception of space and a trained practitioner’s eye. In comparison, Figure A.20 illustrates the collection of images falling into the 10th Avenue Square category.

Figure A.19 is a small sampling of the hidden patterns and commonalities revealed throughout the study. These types of findings can offer a deeper connection to the public view of the built space. Each design is intended to meet the challenges of use. Each pre-built rendering is expressed with the final touch of human engagement. In Figure A.19 pedestrians captured and shared other pedestrians looking at the views, just as designers render the space with human figures. These results offer alternative clues to the success of 10th Avenue Square. Advances in technology provide the pedestrian with the tools to capture and share the visual information.

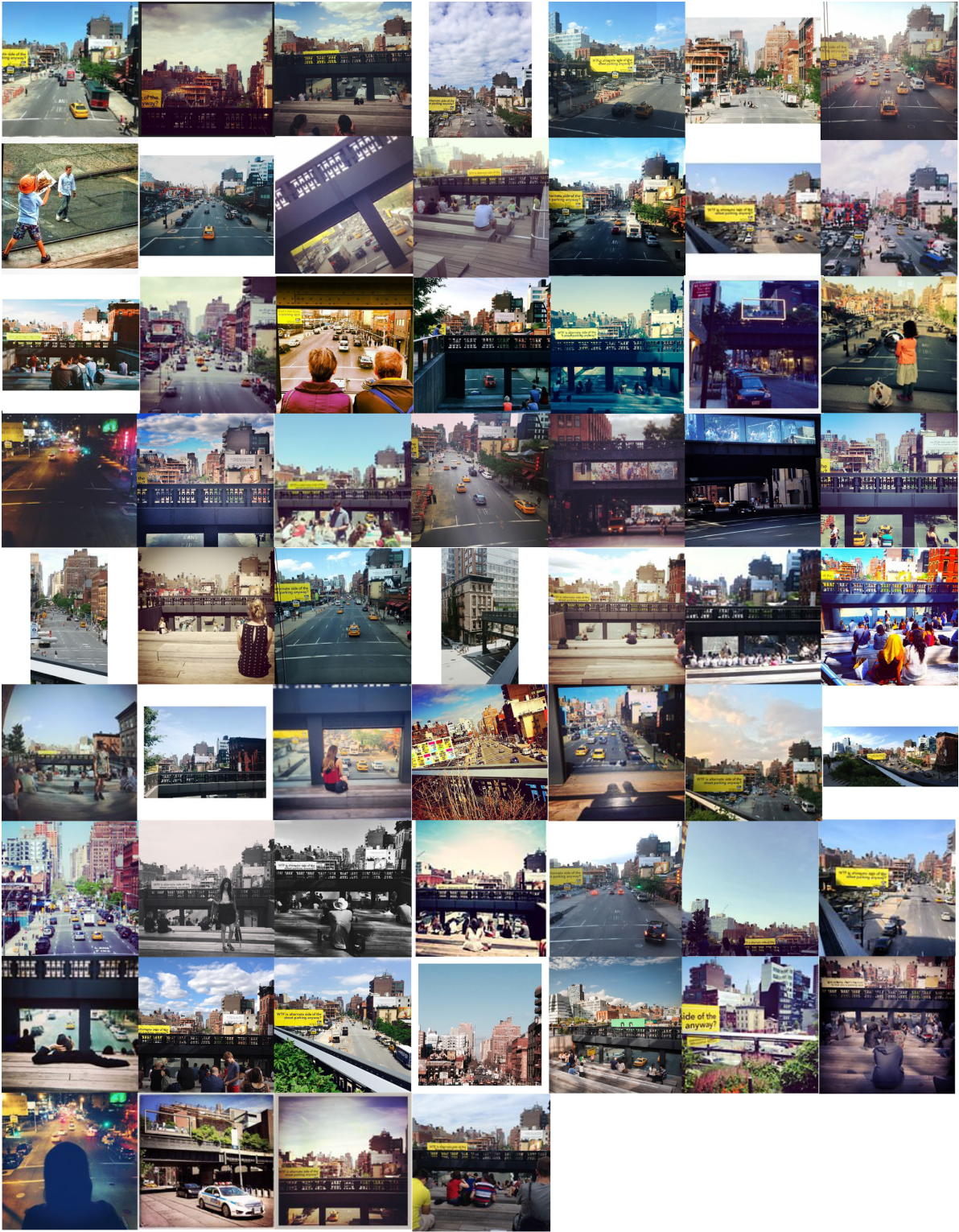


Figure A.20 Images of captured and shared images at 10th Avenue Square

William H. Whyte said, “What attracts people most, it would appear, is other people.”² A portion of the captured and shared photographs on or near 10th Avenue Square begin to illustrate Whyte’s past work through the advances in technology. Field Operations should value the 10th Avenue Square photographs of people taking pictures of people and look to the design of the space as an entity to emulate in further advancement of public work.

NON-DESIGNED ELEMENTS: Eduardo Kobra Mural

The most prominent Non-Designed element in the secondary Views sub-category illustrated in Figure A.21, was the Eduardo Kobra mural. A reinvention of the 1945 photograph V-J Day in Times Square by Alfred Eisenstaedt, this installation showcased vivid coloration, or saturated colors, and was known as a popular attraction among pedestrians.³

The mass appeal of the mural permeates beyond the High Line into the surrounding Chelsea neighborhood. On a recent site visit to the park in the spring of 2015, a fine art store showcased three variations of the Kobra mural in a window display - three years post the mural’s reveal. And national appeal for Eduardo Kobra’s style has been used in fundraising events, such as P.S. Arts in Los Angeles at the LA Modernism opening where guests could create their own Kobra-styled art.⁴

While it is not surprising to find Kobra’s work captured and shared in abundance by the general public, it is interesting to see the Kobra piece act as a pedestrian calming device. On the High Line, during the informal, in-field visit to the site, people would stop and take pictures of the mural. In an area of the park, the Woodland Flyover, where the trail was elevated, narrowed and provided minimal seating, people were stopping to capture, share or just look at the mural. And just as a speed bump, or a curve can slow vehicular traffic, the mural calmed the pedestrian to a slower stroll through that particular portion of the High Line. When the trail begins to narrow and the site furnishings are at a minimum, the design suggests movement. Yet, for an extended period of time the commissioned piece offered a surprise pop of color and it congested the pedestrian path.

The High Line came first. Section 2 (West 20th Street to West 30th Street) opened to the public on June 8, 2011.⁵ Eduardo Kobra was commissioned to paint the mural at 25th and 10th Streets in June of 2012. The High Line offered an exceptional vantage point of the mural. And within all seven categories, the most captured and shared photo was the Eduardo Kobra mural.



Figure A.21 Images of captured and shared Eduardo Kobra mural

The upside, the iconic status of the High Line depicts the powerful potential to catapult well-received work placed on and around the High Line. The downside, the mural had the potential to bottleneck the park diminishing the pedestrian experience on heavily trafficked days.

NON-DISCERNIBLE: Sunrise/Sunset

The secondary Activity sub-category Sunrise / Sunset accounted for the most prominent collective group of Non-Discernible Elements. This grouping of photos illustrated in Figure A.22 suggests there is a desire for pedestrians to utilize the built environment to connect with nature. Each photo’s most distinct reference is of the skyline or the reflection of light off of man-made elements. These photographs have the potential to impact future designs by identifying the need for parks to be a dynamic space capable of ebbing and flowing, or fluidly moving between passive and active spaces.

Before examining the Sunrise/Sunset sub-secondary category, the Views represented in the findings touched on the volumes of people using the space. And while a higher visitor count suggests a successful design, photographs where people are not the primary focal point begin to reveal the calm that urban space has the potential to provide. Just as nature has its seasons, each day and hour on the High Line suggests a differing level of intensity. And through the analysis process, the Views illustrate the need for parks to capture the full spectrum of human interaction.

PUBLIC ART

According to the Friends of the High Line, the art presented on and around the elevated park includes, “site site-specific commissions, exhibitions, performances, video programs, and a series of billboard interventions.”⁶ Each piece “invites artists to think of creative ways to engage with the uniqueness of the architecture, history, and design of the High Line and to foster a productive dialogue with the surrounding neighborhood and urban landscape.”⁷

Captured and shared photographs from the Instagram pull consisted of curated exhibits as well as other public art installations not commissioned for the High Line. Each photo from the June 2014 pull that consisted of art was categorized as Public Art when either the majority of the picture plane revealed art, or the public art piece was the most prominent element in the viewshed.

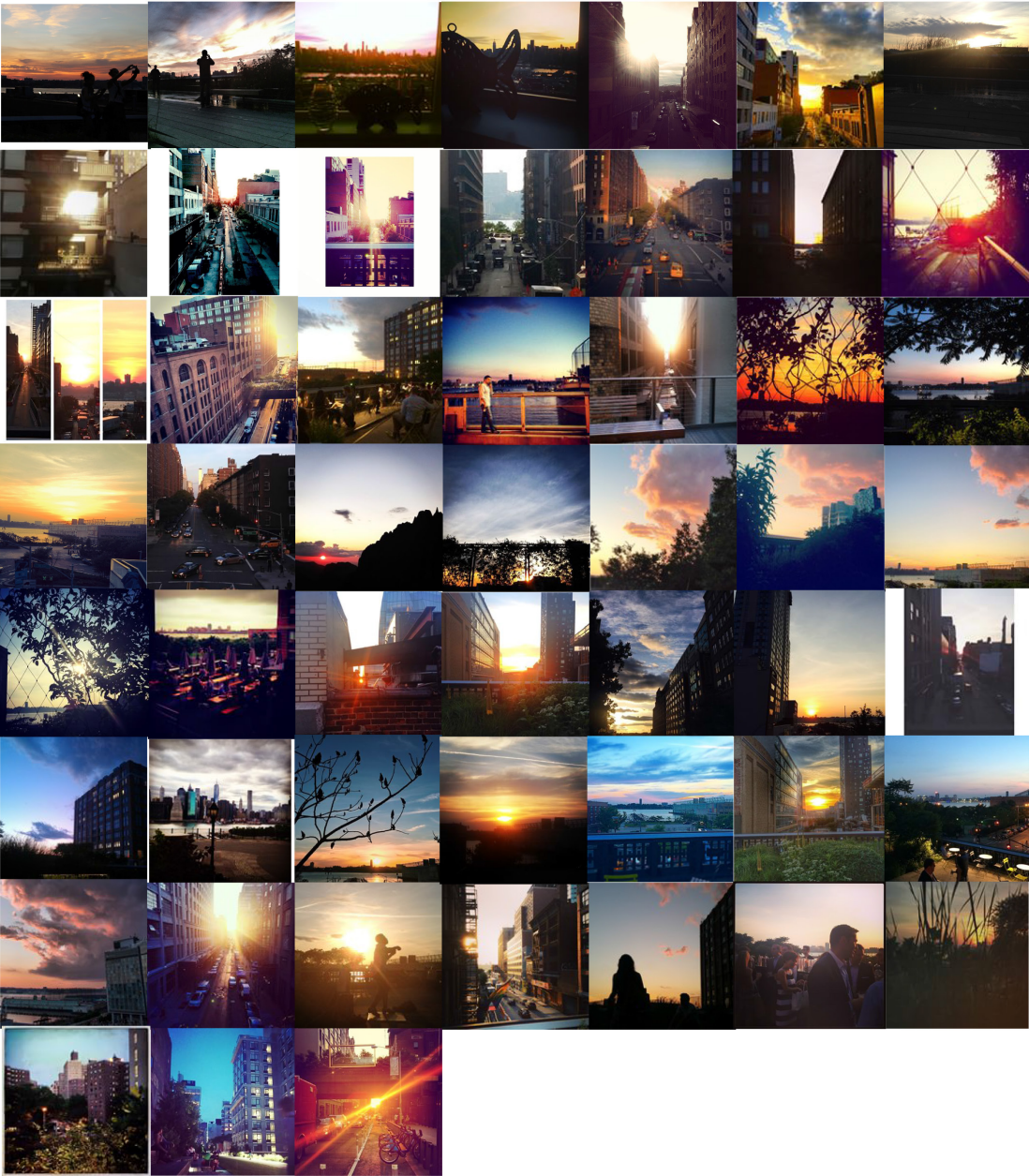


Figure A.22 Images of captured and shared images of the Sunrise/Sunset

In order to draw references from the Public Art sub-category, two additional categories of the photographs were established: Art Commissioned by the Friends of the High Line, and Art Not Commissioned by the Friends of the High Line. And all art was considered to be a Non-Designed Element. The breakdown of the primary Public Art sub-category can be seen in Figure A.23.

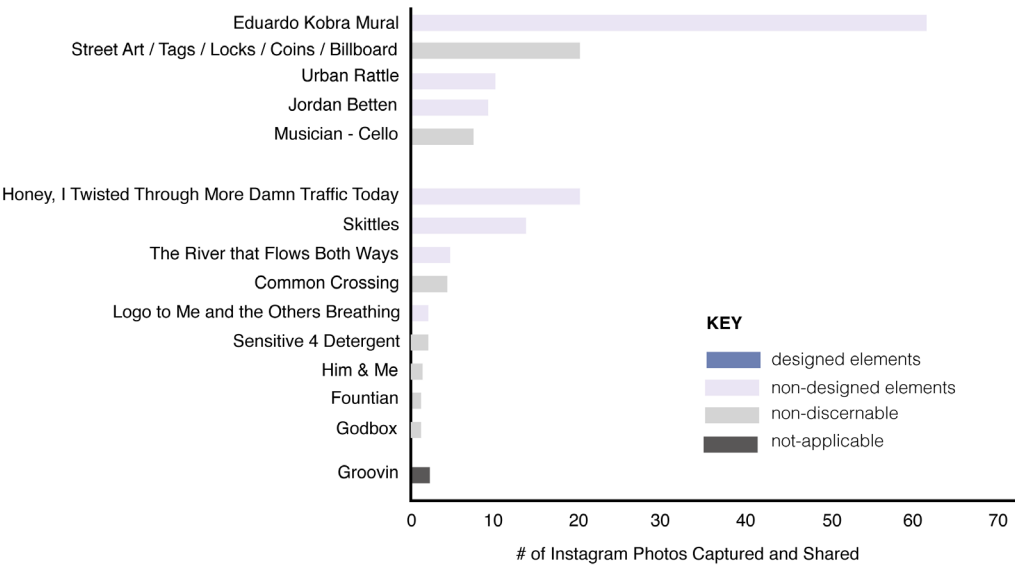


Figure A.23 Numerical and design breakdown of Public Art

NON-DESIGNED ELEMENTS: Eduardo Kobra Mural

The Eduardo Kobra Mural had more than doubled any other Public Art sub-categorized photographs. Consisting of 63 photographs, or 37 percent of the Public Art Instagram pull, the mural, in conjunction with the Eduardo Kobra mural captured and shared photos that fell into the Views category, was the most photographed element of the June 2014 study.

In the Views sub-secondary category, the numerous collected images, as illustrated in Figure A.24, prompted questions such as: was there enough seating and was the flow of pedestrian traffic impacted? With regard to Public Art, the up close images of the mural have the potential to begin to offer insight into the high regard the public has for capturing images of color.

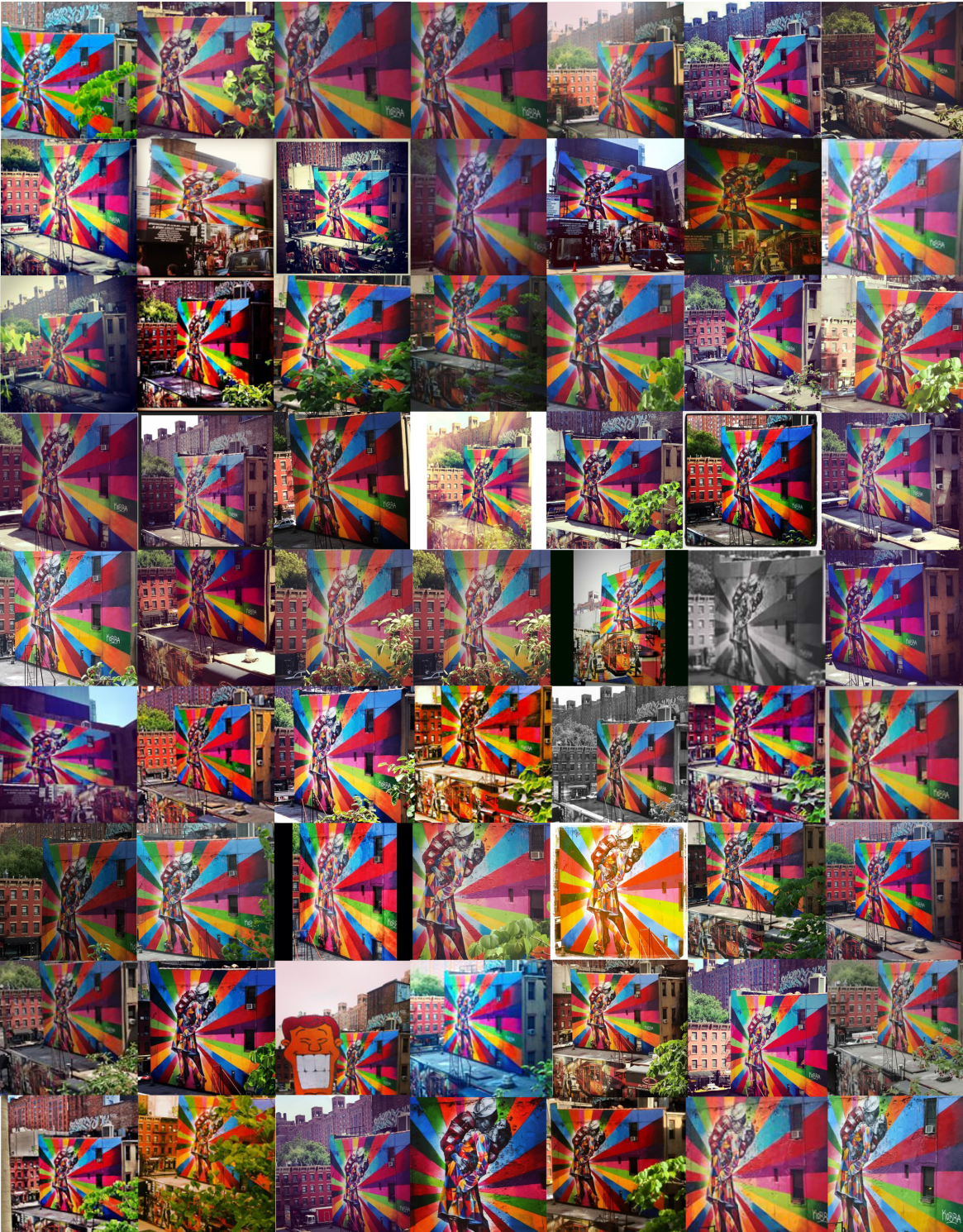


Figure A.24 Images of captured and shared images of the Eduardo Kobra Mural

With the Eduardo Kobra mural collectively being the most represented image of the Instagram study, it becomes important to understand is vivid colors elicited a high captured and shared collection. If pedestrians are attracted to saturated colors amid the urban setting, practitioners can build upon this knowledge to use color in their favor as well as to help the community understand the importance of optimal placement of highly contrasting public art and the core natural setting of the urban parks.

DISCERNIBLE & NON-DISCERNIBLE ELEMENTS: Archeo

The collective captured and shared photographs from the Archeo exhibit curated by the Friends of the High Line has the potential to offer insight to practitioners. Archeo was a series of commissioned public art installations based on technology and obsolescence and the captured and shared works can be seen in Figure A.25. Six of the seven participating artists’ pieces were captured and shared during the weeklong Instagram study from June 14 through June 20, 2014. Archeo as a whole was not a highly captured and shared collection within the Public Art sub-category. But it is the lack of Instagram photos representing these works, which begin to offer insight to Field Operations.

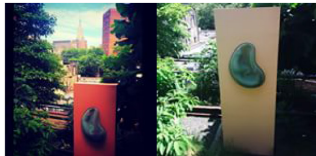
Part of, but separated from the rest of the Archeo exhibition was Josh Kline’s Skittles, a sculptural work representational of “the language of advertising,”⁸ Each ‘smoothie’ bottle was a mixture of unconventional ingredients used to illustrate modern life. (See Figure A.25). Skittles prominence in the study was perhaps due to placement. Located on the High Line by the Standard, Kline’s work offered pedestrians an almost interactive experience. And the physical placement of the piece directly on the line evoked more curiosity. All other Archeo installations were quietly tucked into the landscape just beyond the reach of the pedestrian. While the captured and shared non-repetitive nature of Common Crossings, Logo to Me and Others Breathing, Sensitive 4 Detergent, Him & Me, Fountain and God Box suggested these pieces were creating the response desired from the park setting; reflections of technology and obsolescence.



Josh Kline,
Skittles



Marianne Vitale,
Common Crossings



Antoine Catala,
Logo to Me and the Others Breathing



Yngve Holen,
Sensitive 4 Detergent



Jessica Jackson Hutchins,
Him & Me



Jessica Jackson Hutchins,
Fountain,



Isabelle Cornaro,
God Box (column)

Figure A.25 Collection of captured and shared Archeo exhibits

The success of the High Line is evident on a broad spectrum. With regard to Archeo, less is sometimes more. Designing future parks with multiple layers of passive space in todays technologically advanced public becomes more and more important. According to Juan Enriquez, an essayist for *The Human Face of Big Data*:

We played, swam, wallowed, and drowned in 1.8 zettabytes of data...if you were inclined to store this data on 32-gigabyte iPads, you would need only 86 billion devices – just enough to erect a 90-foot-high wall 4,000 miles long from the bottom of your shoes to the center of the Earth.⁹

The amount of data we create, collect and disseminate is only going to increase. Places to re-set or reconnect are essential to the well-being of the human race. Richard Louv, journalist and author, coined the term, ‘nature-deficit disorder,’ or the reduction in the ability to find meaning in the life around us.¹⁰ As design practitioners, we need to adopt the idea of rethinking nature’s role in human life as more than a safe and beautiful space, these spaces offer opportunities for healthy and intelligent cities.¹¹ Perhaps when it comes to passive space, the best we can hope for is no photo, nothing captured and nothing shared. This is the true celebration of the Archeo project.

VEGETATION

Vegetation accounted for 126 of the 1066 photos categorized as Activity, or roughly 12 percent of the pull. While at first glance, photographs of the plant Echinacea was a clear frontrunner, upon further assemblage and coding as illustrated in Figure A.26, the Vegetation photos told two fundamental stories: Vegetation Filling the View Shed and Vegetation as a Portion of the Viewshed.

Breaking the photos into these two additional Vegetation sub-categories helped to distinguish between images capable of offering insight of spatial definition as compared to Non-Discernible Elements. For example, an Echinacea bloom captured on the High Line, could just as easily be a photograph taken at a nearby garden. The photo does not give any 3-dimenshionality to the space beyond the view frame and therefore falls into the secondary category, Vegetation Filling the Viewshed.

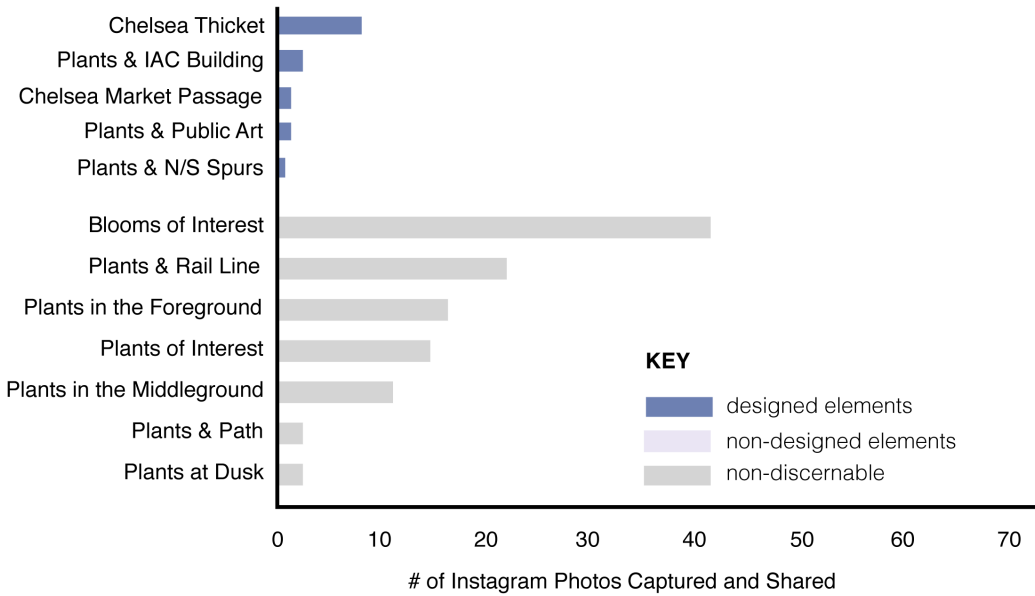


Figure A.26 Numerical and design breakdown of the Vegetation

On the other end of the spectrum, people were capturing and sharing photos where the plants were the main element in the context of the park. Referencing the photograph in Figure A.27 depicting tufts of grasses and perennials in bloom growing through the rail line with the Meatpacking District in the background. This photo could not easily be mistaken as photo from another park. Therefore, the secondary Vegetation category, Vegetation as a Portion of the Viewshed offers deeper insight for practitioners looking to glean insight from a specific built location. And the 2 dimensional photos offer insight into the publics perception on the landscape elements.



Figure A.27 Example images of the two Vegetation sub-categorieis

DESIGNED ELEMENTS: Chelsea Thicket

Chelsea Thicket, illustrated in Figure A.28, has the potential to reinforce the design fields’ use of natives or prairie-minded compositions as an urban calming opportunity as well as being beneficial for the environment. What is most interesting about this sub-category is the contrast it holds to the Blooms of Interest where color and bloom time was the most prominent collective features.

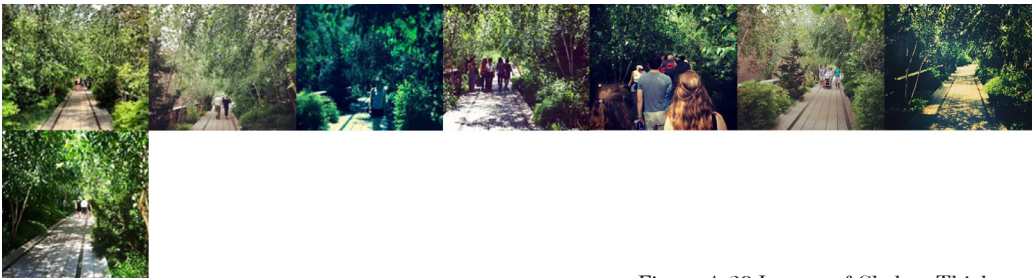


Figure A.28 Images of Chelsea Thicket

The Chelsea Thicket’s main component is the plant materials. Standing in juxtaposition to the vibrant colors of the Blooms of Interest, the Chelsea Thicket has the potential to offer insight to Field Operations of the concepts of refuge as well as the complexities involved in designing layers of space. The remaining Non-Discernible coded photographs in Figure A.26 further solidify the idea of the publics’ request for refuge in a park setting. Chelsea Thicket, along with Plants and the Rail Line (Figure A.29), Plants and the Foreground (Figure A.30), Plants of Interest (Figure A.31), and Plants in the Middle Ground (Figure A.32), as well as Plants & Path and Plants at Dusk (not illustrated) reinforce the potential for a park to offer a calming environment from the city streets.



Figure A.29 Images of Plants and the Rail Line

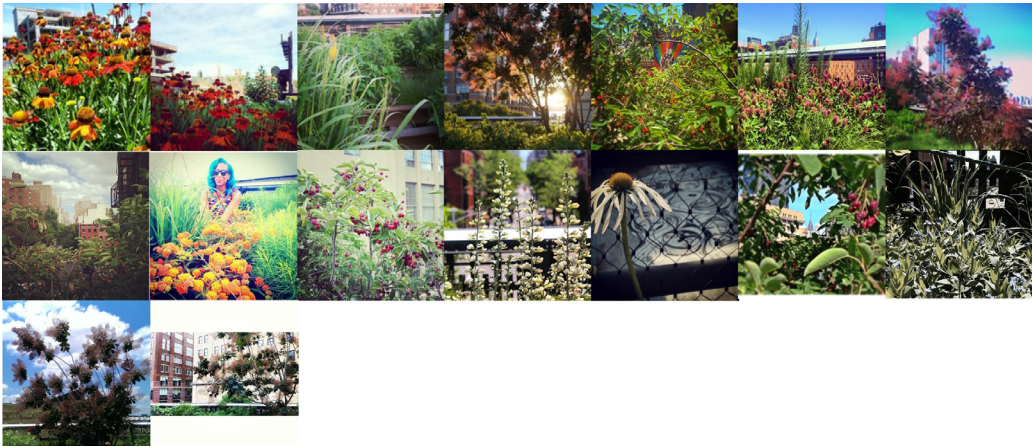


Figure A.30 Images of Plants and the Foreground

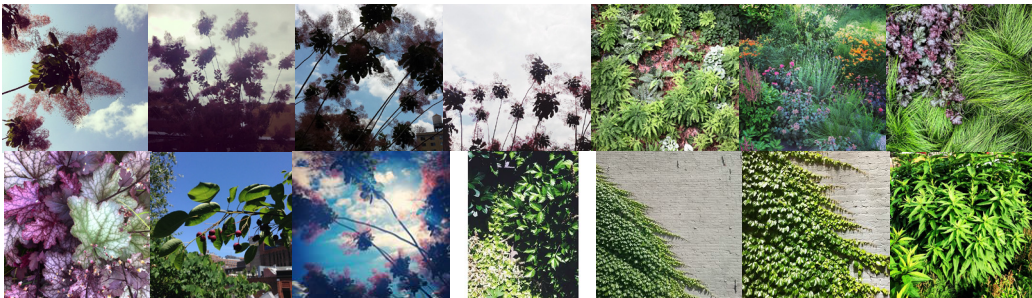


Figure A.31 Images of Plants of Interest

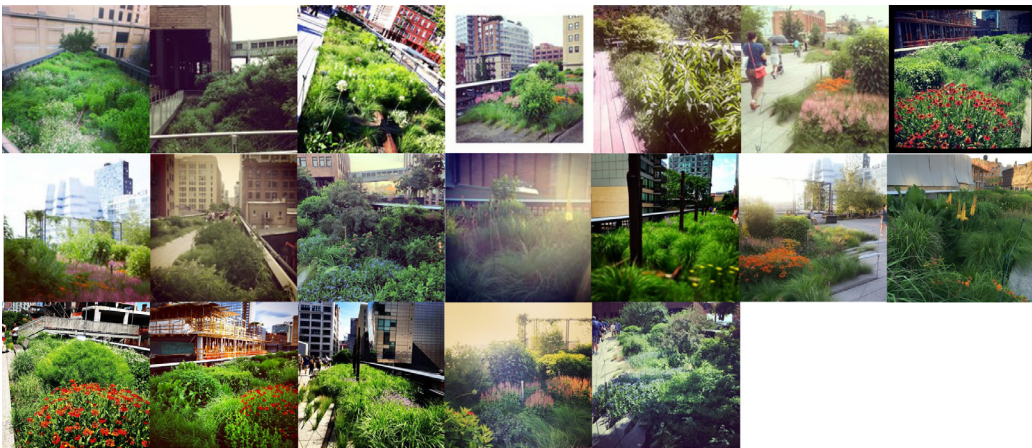


Figure A.32 Images of Plants in the Middle Ground

Plants and the Rail Line, illustrated in Figure A.29, extends the potential to offer insight to Field Operations. In these captured and shared photographs, native plantings merge with preservation. The High Line was built as a walking narrative of the city it cuts through. The story of the city unfolds around, above and even in the planting beds as the pedestrian moves from one end of the park to the other. The elevated rail line opened in 1934 and operated as the commercial and industrial hub of the city until the run of the last train in 1980.¹² While a portion of the success of the High Line falls to the historical context of the space as read in the award-winning guidebook, *On the High Line: Exploring America’s Most Original Urban Park*, these opinions are rendered useful through the dCODE tool as the general public’s captured and shared photos encompassing historical elements, such as the rail line begin to emerge. This knowledge illustrates how Field Operations current work is beneficial for historical conservation of public space, and has the potential to propel the historical integration of new sites within the context of the urban environment.

NON-DISCERNIBLE ELEMENTS: Blooms of Interest

Blooms of Interest were the most documented element in the Vegetation sub-category. (Figure A.33) The compilation of captured and shared photographs has the potential to offer practitioners two insights.

The first insight reveals flowers in full bloom were captured and shared more than spent blooms or blooms in the pre-emergence stage. Only two of the photos in Figure A.33, the drumstick allium (third photo from the left on the top row) and the allium near the path (second photo from the left on the second row from the top) are not in full bloom. Secondly, bright colors were an apparent theme throughout the Blooms of Interest sub-category. Whites and hot pinks, oranges, reds, and yellows, are found in all but one of the photos where a shade of peach was captured and shared (Figure A.33).

Bright coloration is also revealed in the Public Art and Views sub-categories. The Eduardo Kobra mural takes precedence over all other captured and shared photographs and the high number of bright colored photos are reflective of possible pausing or stopping moments along the trail. This information begins to offer insight for implementing planting plans. In the field of horticulture, bright colors offer an additional layer of directional advice to the passerby. Planting color in mass near an entrance is an accepted rule. But with the advances of technology, bright colors have the potential to slow pedestrian traffic looking to capture and share vivid experiences.

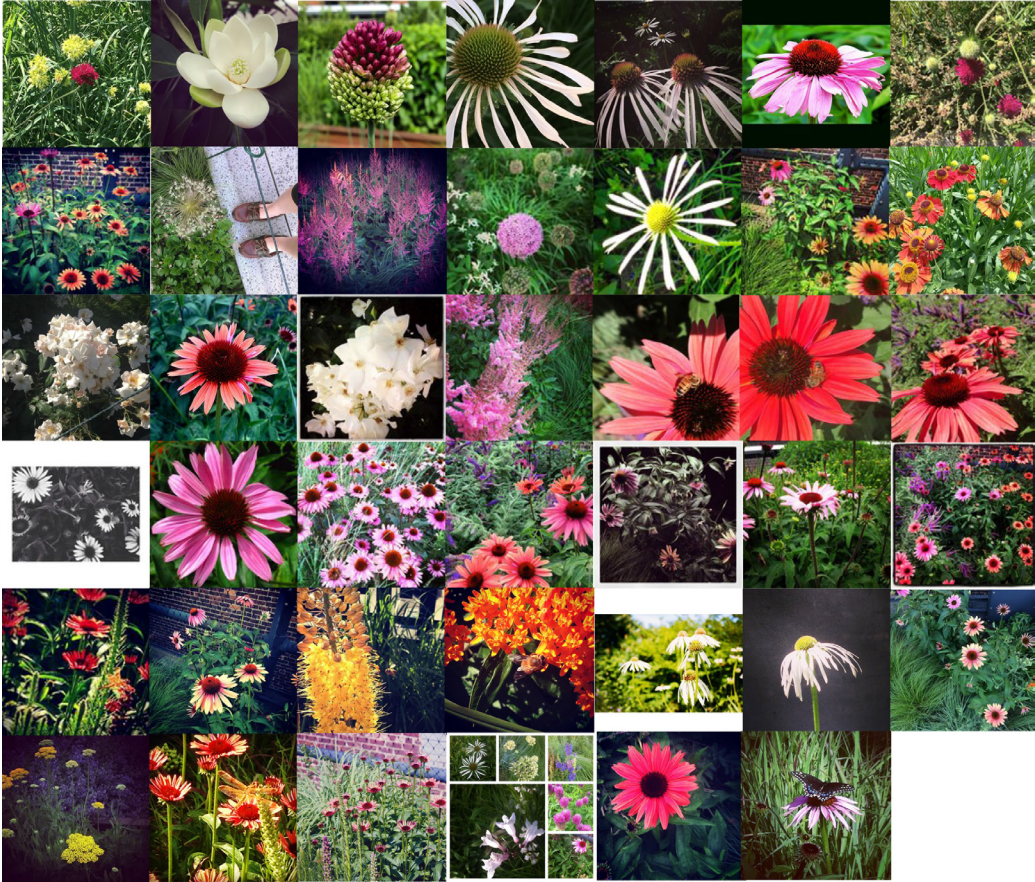


Figure A.33 Images of Blooms of Interest

While the full bloom and coloration results have not been vetted against other times of the year, the preliminary findings have the potential to offer insight to future practitioners implementing planting plans as a portion of the design process. With more and more pedestrian Instagram use, vivid coloration could become a tool for guiding pedestrian traffic flow in the urban environment. In addition, the Blooms of Interest visual information has an educational component. And the potential to guide the general public on the importance of seasonal interest and the environment could be more impactful with unbiased pedestrian photos.

ARCHITECTURE

In order to be classified as Park Activity Architecture, each of the photos from the June 2014 pull needed to either fill the majority of the picture plane with an image of a building or of architectural details. This category is set apart from all others due to the amount of photos captured and shared of details. Therefore, the Architecture sub-category was further delineated into Buildings and Details as illustrated in Figure A.34.

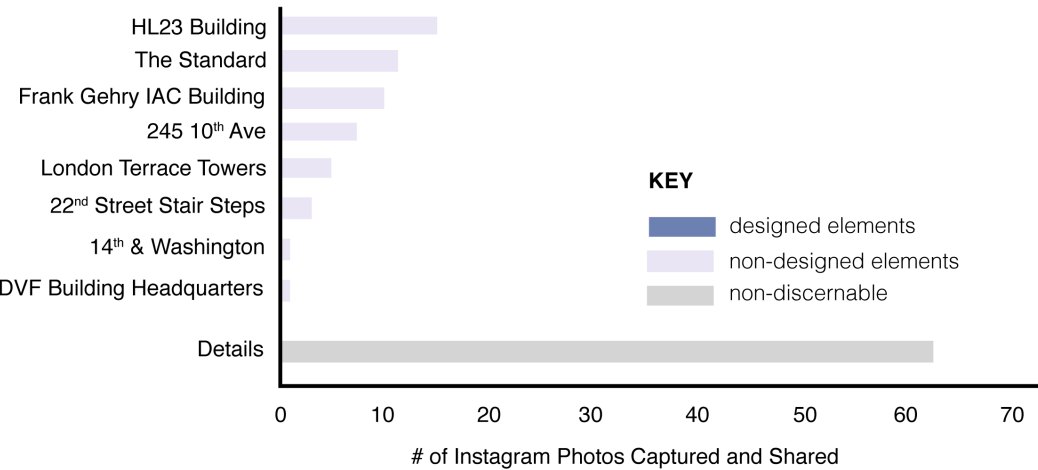


Figure A.34 Numerical and design breakdown of Architecture

NON-DISCERNIBLE: Details

The most significant portion of the Architecture sub-category was the Non-Discernible Elements. Over half of the captured and shared photographs coded as Architecture contained portions of buildings that could not be identified in the photo as illustrated in Figure A.35.

Vegetation was the only other sub-category from the captured and shared photographs from the study where the features of the sub-group were more prominent than the collective story of the image on the park. These findings have the potential to offer insight to Field Operations regarding the context of the space. And unlike the Echinacea flower in bloom, the detail images of the buildings, while not capable of being geo located, are discernible enough to be placed along the path of the High Line. Potential insight of the details is therefore similar to the Vegetation sub-category, Plants and the Rail Line. The park cuts through the history of the buildings as well as the line and these elements are of interest to the pedestrian.



Figure A.35 Images of Architectural Details

TRAILS & PATHWAYS

Trails and Pathways accounted for 82 of the captured and shared Activity photos from the June 2014 Instagram pull. In order to be coded in the Trails and Pathways Activity sub-category, the trail needed to be the primary focal point in each viewshed. A pattern that emerged within this category was the majority of Trails and Pathways photographs revealed a one-point perspective with the pedestrian’s physical placement looking down the trail. The majority of these photographs were also easily geo located on a Designed Element as illustrated in Figure A.36.

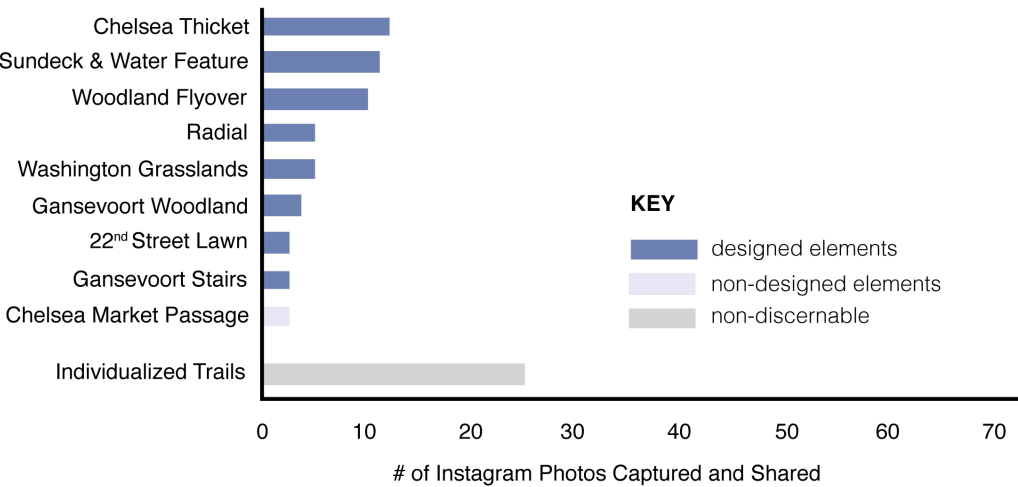


Figure A.36 Numerical and design breakdown of Trails and Pathways

DESIGNED ELEMENTS: Chelsea Thicket and Sundeck & Water Feature

Chelsea Thicket and Sundeck & Water Feature were the most prominent Designed Elements in the Trails and Pathways sub-category. Both offered collective, but different potential insight to Field Operations.

Chelsea Thicket, as illustrated in Figure A.37, is similar to the Chelsea Thicket captured and shared photographs coded in the Vegetation sub-category. The primary difference is whether the main component of the view shed fell to the plant materials or the paved path. While offering slightly different vantage points, the two sub-categories offer relatively the same insight; the potential to offer insight to Field Operations of the concepts of refuge as well as the complexities involved in designing layers of space.

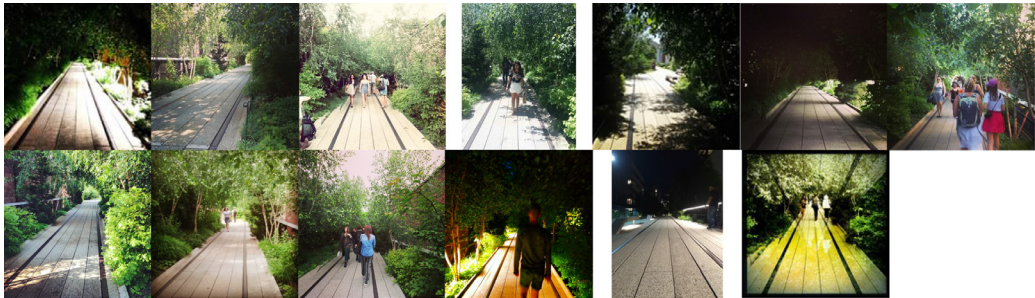


Figure A.37 Images of Chelsea Thicket

Sundeck and Water Feature, on the other hand, offer insight into active play. Through the captured and shared images, the photographs illustrated in Figure A.38 showcase more pedestrian use. Water on the pavement as well as children running though the water has the potential to offer insight to the need for a range of spaces built within urban parks.

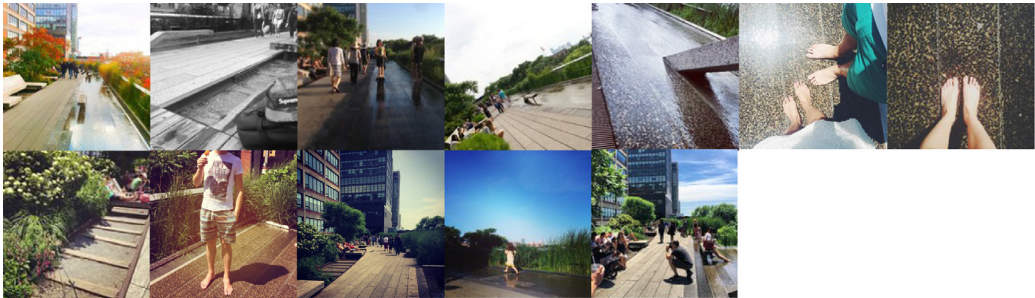


Figure A.38 Images of Sundeck and Water Feature

SITE FURNISHINGS

The Site Furnishing category accounted for 10 percent of all the Activity pulls. In order to be sub-categorized as Site Furnishings, the seating component in the photograph either needed to be unused or used without having the pedestrian’s photos compose the majority of the view frame. In other words, if facial recognition was possible, the photographs were filtered out into Park Friends or Park Selfie. Therefore, the majority of images that fell into Site Furnishings were either of unoccupied seats or benches, or occupied seats or benches with unrecognizable fronts or the backs of pedestrians falling into the view shed.

The majority of photos in this category are captured and shared where the furnishings, or built in features are used by people and the breakdown of this sub-category is illustrated in Figure A.39.

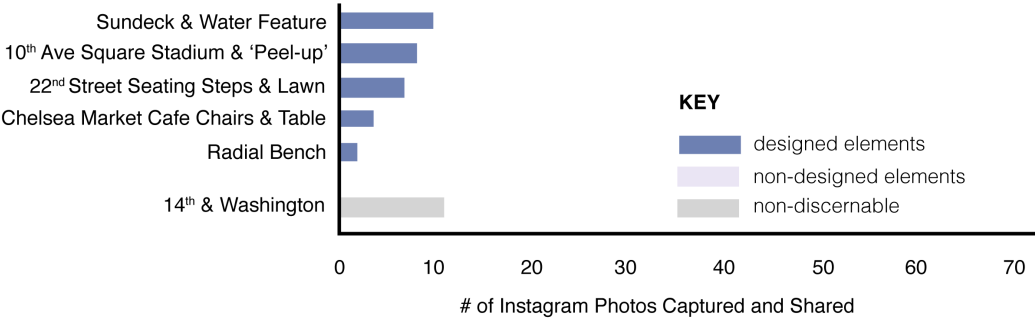


Figure A.39 Numerical and design breakdown of Site Furnishings

DESIGNED ELEMNTS: Sundeck & Water Feature and 10th Avenue Stadium & ‘Peel-up’

The Sundeck and Water Feature photographs coded as Site Furnishings depict a variety of resting scenes. From lounging on the moveable furnishings to relaxing on the ‘peel-up’ bench, the theme throughout these photos is rest (Figure A.40). Amid the restful compilation of photographs are a series of what appears to be each of the photographer’s feet while lounging.

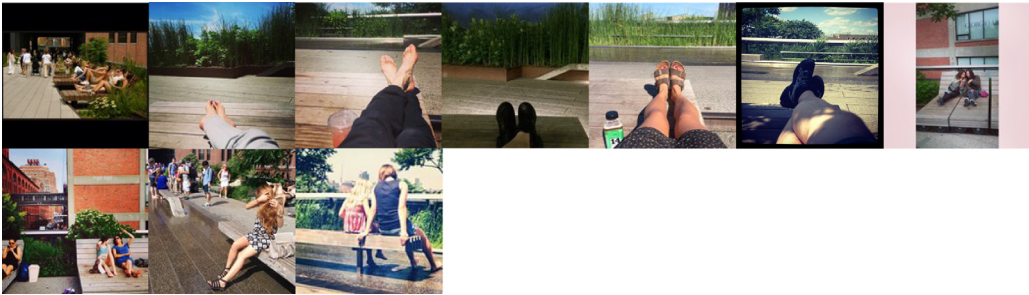


Figure A.40 Images of Sundeck and Water Feature

The passive activities in the Site Furnishings sub-category differ from the Sundeck and Water Feature photographs coded as Trails and Pathways. These photographs are a combination of an active and passive space. From running water to running through water, the space as depicted in the photographs in Figure A.40 tell a story of play. The Sundeck and Water Feature when broken down into these distinct sub-categories again offer insight into the need for spaces designed for multiple use.

SIGNAGE

Signage accounted for 2 percent of the total captured and shared Activity photographs. Each Instagram photograph coded as Signage filled the viewshed with visual information for public use. Therefore, each photo in the Signage category was incapable of being identified as portion of a Designed or Non-Designed Element and the layout of the coded elements are illustrated in Figure A.41.

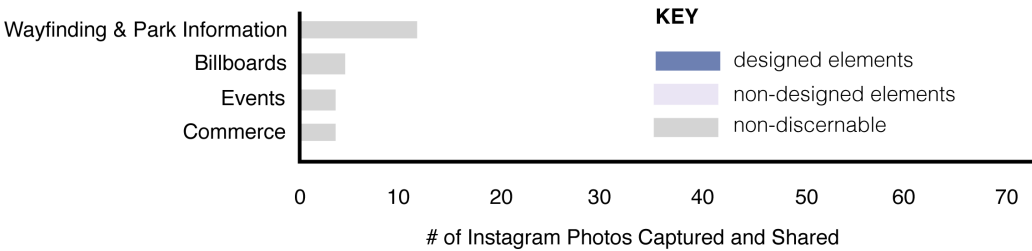


Figure A.41 Numerical and design breakdown of Sundeck and Water Feature

Wayfinding and Park Information (Figure A.42), Billboards (Figure A.43), Events (Figure A.44), and Commerce (Figure A.45) images were rarely captured and shared in the week-long study in June 2014. Beyond the basic way finding information captured and shared throughout the park, other photographs in the category began to give a richer context to the programming and design of the space.

NON-DISCERNIBLE: Events

The open space concept of the Chelsea Market Passage allows for an array of programming. Illustrated in Figure 1.44, is the High Line Coach Party. The party was held on June 19th on the upper level of the Chelsea Passage and is one example of adaptable use of space. The carnival-inspired event was a collaboration between the Friends of the High Line and Coach to raise money for the park. While only three photos were captured and share in the Signage sub-category, many other photos were captured and shared from the June 2014 Instagram pull and the flexibility of the space has been captured, shared and coded as Public Art, Site Furnishings and Views sub-categories as well as Signage.

Conclusion

The hypothetical professional report revealed the desire of the public to capture images of the environment over all other categories, including Selfie and Friends. Through hidden patterns and commonalities, dCODE revealed the publics collective perception for the High Line to be a dynamic space, capable of ebbing and flowing. Both passive and active moments are present and illustrated. At times, the results are not as anticipated, such as the high volume of observers capturing and sharing images of the Eduardo Kobra Mural. These opportunities offer Field Operations information to address and educate both designers and the general public about how external elements can impact, and be impacted, through good design.

dCODE is a means to an end. It offers collections of information. Through the collective analysis, it becomes apparent that people are sharing images of environment over all other images. But dCODE it is not a tool created to record a ‘more is better’ scenario. In the end, as noted in the Archeo exhibits, less collected images have the potential to reveal what is hidden, or not photographed. Perhaps people are spending more time on the Woodland Flyover looking and reflecting. Perhaps for a small moment in time during a hectic workweek, the park offers solace, a place where people forget to snap a photo and record a moment. dCODE is a new

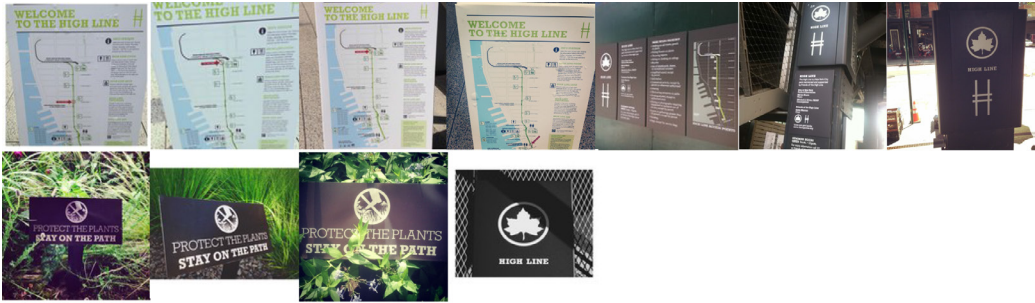


Figure A.42 Images of Wayfinding and Park Information



Figure A.43 Images of Billboards



Figure 1.44 Images of Events



Figure 1.45 Images of Commerce

tool working toward offering insights into the complexities of human perception. Through the high volumes of collected and hidden patterns as well as the missing or less captured patterns, the unbiased analysis offers site-specific scale analytics while allowing Field Operations the opportunity to think in the context of the space as a holistic unit.

ENDNOTES

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2 Project for Public Spaces. William H. Whyte. 12 8, 2015. <http://www.pps.org/reference/wwhyte/> (accessed 12 8, 2015).

3 Tickle, Ashley. “Recent Artworks in Our Neighborhood.” Friends of the High Line. August 9, 2012. <http://www.thehighline.org/blog/2012/08/09/recent-artworks-in-our-neighborhood> (accessed August 4, 2015).

4 Martell, Chelsea. “Our Spring 2014 Fundraising Recap.” P.S. Arts. June 24, 2014. <https://www.psarts.org/spring-2014-fundraising-recap/> (accessed August 5, 2015).

5 Friends of the High Line. *About the High Line*. 12 9, 2015. <http://www.thehighline.org/about> (accessed 12 9, 2015).

6 Friends of the High Line. *About the High Line*. 12 9, 2015. <http://www.thehighline.org/about> (accessed 12 9, 2015).

7 Friends of the High Line. *About the High Line*. 12 9, 2015. <http://www.thehighline.org/about> (accessed 12 9, 2015).

8 “High Line Art.” Friends of the High Line. April 17, 2014. <http://art.thehighline.org/project/archeo/> (accessed August 4, 2015).

9 Smolan, Rick, and Jennifer Er Witt. *The Human Face of Big Data*. Sausalito, California: Against All Odd Production, 2012.

10 Cho, Renee. Why We Must Reconnect with Nature. 5 26, 2011. <http://blogs.ei.columbia.edu/2011/05/26/why-we-must-reconnect-with-nature/> (accessed 3 15, 2016).

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